DOCUMENT RESUME

ED 355 846 HE 026 279

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TITLE Funding Public Higher Education.
INSTITUTION Grambling State Univ., La.
PUB DATE 7 Jan 93
NOTE 94p.
PUB TYPE Reports - Descriptive (141)

EDRS PRICE MF01/PC04 Plus Postage.
DESCRIPTORS *Budgeting; College Administration; Computation; Cost Estimates; Departments; Educational Facilities; Educational Finance; Expenditures; *Financial Needs; Financial Policy; *Financial Support; Higher Education; *Public Colleges; *Resource Allocation; School Funds; State Colleges; Trend Analysis
IDENTIFIERS *Formula Budgeting; *Formula Funding

ABSTRACT

This document describes a procedural alternative to current practice predicated on a critical analysis of the literature concerning the funding of public institutions of higher education. The document is partitioned into five sections. The first section describes the development of the formula concept. The next section describes how funding formulas have been derived in various states. The areas covered in this section include funding approaches for instructional and departmental research, libraries, general administrative and general expenses, student services, and physical plant operation and maintenance. The third section presents an overview of funding directions at the national level. The topics discussed in this section are the general indicators of demographics, students, expenditures, and cost centers and revenue sources. The fourth section presents the limitations to the existing funding formulas. The final section then presents a new model for formula funding which attempts to compensate for the limitations identified in previous formulas. The new model specifically addresses curriculum delivery and curriculum research, leadership, the library, operations, state administrative offices and revenue sources. Contains 61 references. (GLR)

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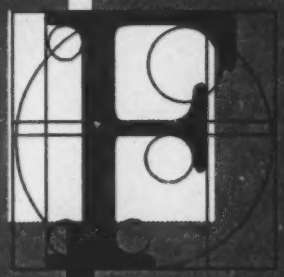

UNDING PUBLIC HIGHER EDUCATION

HE 026 229

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FUNDING PUBLIC HIGHER EDUCATION

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January 7, 1993

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Although nearly half (1,563) of the 3,535 higher education institutions in this country are financed by the general public, they expend only twice as much money per year ($63,193,853,000) as the private schools ($34,341,899,000). After deducting revenues, it costs nearly as much to operate the 1,563 public institutions ($40,887,720,000) as it does to operate the 1,972 private schools ($34,341,889,000). Those public institutions enroll nearly ninety percent (10,514,973) of the (11,665,338) undergraduates studying in the United States. The per pupil cost of a public education is *eight times less* than of a private education in the United States. The total per pupil expenditures at public colleges and universities is twenty percent *less* than at private institutions.

Why are public institutions less expensive to operate? Private institutions are often controlled by a single governing board that examines budgets in terms of market conditions. Public institutions are often governed by a tiered system consisting of governing boards, governors and legislatures. That tiered system of governance as well as the influence of external auditors results in an intensive operational review of public colleges and universities. The intensive review process results in systematic budget development for public institutions. Governing boards have searched for systematic budget methodologies and many governing boards have adopted what has been called *formula funding* in order to establish institutional budgets.

The funding formula concept. A formula is a mathematical representation of a model of institutional operations and priority judgements reflected in the institutional mission. The elements of the formula are the factors that are believed to constitute the parameters upon which an institution operates. The weights assigned to each of the parameters reflects the relative priorities given to each of mission factor. The nature of the mathematical function which defines the formula reflects how policy makers believe the elements of the mission relate to each other (i.e., linear or exponential student enrollment with time, etc.). Policy decisions are the primary criteria for establishing the weights which reflect social policy (priority) decisions. The elements

of a formula (model of institutional operations) should be based upon both operational and policy considerations. The operational model should be based upon an analysis of day-to-day operations. The policy elements should be derived from an analysis of the desired outcomes. After a formula is established, institutional characteristics are substituted for relevant variables and a budget calculated.

The purpose of this document is to describe a procedural alternative to current practice predicated upon a critical analysis of the literature. This document is partitioned into five sections. The first section describes the development of the formula concept. The next section describes how funding formulas have been derived in various states. The third section describes an overview of funding directions at the National level. The fourth section presents limitations to the existing funding formulas. The fifth and final section presents a new model for formula funding which attempts to compensate for the limitations identified in previous formulas.

DEVELOPMENT OF THE FORMULA CONCEPT

Budget formulas in higher education apparently were developed to allocate limited resources among competing institutions. Prior to the end of World War II, colleges and universities served a fairly homogenous clientele. After the war, enrollments grew and many institutions, teacher training colleges, land grant institutions, and technical schools, evolved and complicated the resource distribution process.

Texas has the distinction of being the first state to have adopted a funding formula for higher education in the 1940s. Since that time nearly every state has adopted some type of formula for funding some segment of higher education operations. The first significant work on funding formulas was conducted in the early 1960s by James Miller at the University of Michigan. Miller defined formulas as:

an objective procedure for estimating the future budgetary requirements of a college or

> *university through the manipulation of objective data about future programs, and relationships between programs and costs, in such a way as to derive an estimate of future costs.* (Miller, 1964, p.6)

Formulas serve as a specific set of procedures that indicate what factors (variables) will be considered in calculating budget requests and *how* they will be taken into consideration in terms of the coefficients attached to each factor and the mathematical forms of the relationships between factors and the final budget.

The purpose of a formula is to provide equitable and adequate funding. There are many advantages to formula funding over political or other means. The need for at least partial reliance upon some type of formula to guide the budget process was pointed out by Henry J. Hector, Executive Director of Higher Education in the State of Alabama in his letter of transmittal of the budget to the legislature.

> *Since the very nature of funding public activities creates constant change, no study of such funding can ever remain completed. We are committed to continuing this work to ensure that Alabama's citizens receive a proper return for their investment in public education....We ask for your continued support of our efforts to bring an increased level of realism and accountability to public higher education finance.*

The need for equity and quality was further underscored by Salley Clauson in a 1988 Memorandum to Campus Heads entitled *Higher Education Funding Formula Task Force.*

> *What our funding formula must ultimately accomplish. ... that is, it must allocate state funds to each institution on a basis which will allow each school to fulfill its designated mission within the state system of higher education in a manner that ensures quality educational services to the students and citizens of the state.*

Equitable funding is providing appropriations to each campus on the basis of need. Iden-

tifing needs and achieving equitable distribution requires formulas that recognize differences in size, clientele, location, and mission. The concept of equity does not mean a distribution of support involving the same amount of money for each institution regardless of size, or the same amount of funds per student regardless of programs offered. Equity is providing support to each institution according to its needs and should not be confused with equality.

Equity is providing the same funds per full time equivalent student. *Equity does not mean equality*. Equity requires differentiation according to program offerings and enrollments by providing the same resources to each institution of higher education for each full time equivalent student enrolled in comparable programs of instruction while recognizing that there are special circumstances of enrollment size, location, stage of development and of clientele served which require modification or exceptions.

Adequacy. Although the need for an equitable distribution of resources to public institutions certainly was a prime factor in the development of funding formulas, other factors also served as catalysts: the need to identify an adequate level of funding, institutional needs to have stability and predictability in funding, and increased professionalism among college and university business officers. Adequacy involves program planning to examine issues of program objectives, program size, program technology, and program support to allocate like amounts of money for like functions. Program planning and budgeting in higher education achieves adequacy by allocating some resources based on perceived societal needs. These allocations are in addition to the funds determined by formula calculation. Allocations of funds to specific institutions outside of the formula to achieve adequacy reduces equity.

Budget formulas are advantageous when they:

- provide an objective measure of the funding requirements of college and university programs since they do not rely on the judgments of program officers and

administrators;

- can reduce open competition among institutions for state funds and can assure each institution of an annual operation appropriation;
- provide state officials with a reasonably understandable basis for determining the financial needs of higher education; and,
- provide a balance between state control over each item in a budget and total institutional autonomy in fiscal matters.

Traditionally, funding for instruction in higher education has relied on certain measures: student credit units, contact hours, faculty workload, or degrees conferred. However, basing funding for faculty on students is a practice that overlooks workload realities. It has been suggested that funding formulas be based, in part, upon *Professional Service Units* which measures a faculty member's complete academic workload rather than directly linked to student credit hours. In addition, in our society today there is a need for continuing and adult education as well as an emphasis upon nontraditional programs and populations. The credit-hour requirement is only one of several that place nontraditional programs at a disadvantage compared to traditional educational efforts.

Some scholars have suggested replacing formulas and guidelines with a system of program budgeting that allows all programs to justify their existence and set their priorities by indicating the money necessary to carry out specific activities so that programmatic budget decisions can be made in terms of public policy parameters and avoid "the greatest danger to quality in higher education...'cuts across the board' " (National Commission on Higher Education, 1982).

Funding formulas have often been based on how much is done (credits and degrees) not how well it is done (changes in knowledge, enhanced lives, or career development). A recent development in formula funding is the inclusion of incentives to improve quality. Quality

improvements may be in the form of improved student performance, higher quality academic programs, lower student-faculty ratios, more efficient institutional management, institutional initiatives to address state priorities, or improved planning.

The search for an ideal funding formula is like the search for life eternal. Recognizing that there is not a formula which is ideal for all applications, after a review and comparison of existing formulas as well as National data, a model will be presented which may be more useful, adequate, and equitable than the ones currently in use.

FUNDING FORMULAS

Funding formula methodologies are almost as diverse as the institutions funded by them. There have been many attempts to derive formulas which attain vertical and horizontal equity as well as adequacy. The purpose of this section is to describe those attempts.

The base factors used in funding formulas can be classified into at least five categories: head count, number of positions, square footage or acreage, full-time equivalent students, or credit hours. Square footage or acreage are base factors used in physical plant formulas, and occasionally in institutional support calculations. Credit hours, Full Time Equivalent Students (FTES), and position count are used most often in instruction, academic support, and institutional support; head count is used most often in student services and scholarships and fellowships.

Differentiation may occur in funding formulas among academic disciplines, such as education or engineering, among levels of enrollment (freshman and sophomore, junior and senior, masters, doctoral, first professional), among types of institutions (community college, baccalaureate institution, comprehensive university, research university), or among types of buildings (brick, adobe, wood, airconditioned, nonairconditioned, etc.). Differentiation is used because each institution is examined closely. Differentiation has become more prevalent as more reliable cost data have become available and is used most often in formulas for instruction. All

of the states that have instruction formulas differentiate in some way.

Apparently, this change to a more complex methodology reflects the growing interest among the states to adequately consider vertical equity factors (unequal treatment of unequals) instead of horizontal equity factors (equal treatment of equals).

This section is limited to the basic funding formula. Formulas for funding special projects and state initiatives will not be discussed with the execption of a brief discussion of academic enhancement and quality improvement programs. In each case where a dollar amount is cited, every attempt has been made to adjust that dollar amount by a factor equal to the consumer price index for that locality in order that each amount will reflect the current dollar value.

Components Of A Funding Formula

In general there are two major components of higher education funding: The General (Multipurpose) Component and The Special Purpose Component. The first component supports basic campus operations. The second component supports special projects deemed appropriate by either the legislature or the governing board. Such projects might include economic development (expanding and upgrading engineering and other technical capacities), institutional and program quality, or student learning and performance. The majority of this section will focus on the general component.

The Southern Regional Education Board (SREB) suggests ten major components of a general budget formula. Each component corresponds to a segment of either the mission or operations of an higher education institution. The components are:

Instruction	General Academic, Off campus, Preparatory & adult, Occupation & technical, Summer
Academic Support	Academic administration, department operation
General Administration	

Departmental Research	
Public Service	Community service, extension
Libraries	Staff, Collections
Plant Operations & Maintenance	Custodial, Utilities, Building maintenance, Ground maintenance, General services, Public Safety.
Student Services	
General Institutional	

Although the SREB categories are useful, another list of eight categories has been proposed and has been found to be useful in the state of Texas over the past forty years:

- Instruction and departmental research
- Organized research
- Libraries
- Physical plant operation and Maintenance
- Extension and Public service
- Organized activities related to instruction,
- Student services
- General administrative and General expenses

That categorization of formula components was also adopted by the Tennessee Higher Education Commission. The remainder of this discussion of the components of funding formulas will be organized in terms of the latter eight categories.

INSTRUCTION AND DEPARTMENTAL RESEARCH

This category includes compensation for academic administration, faculty members, supporting staff, clerical employees, laboratory expenses, travel, office supplies, office equipment, faculty enrichment, recruiting, other expenses for departments, colleges, and schools for instruction and unsponsored research.

A pertinent note is included here pertaining to instruction. There is a marked tendency

to use professors holding the highest degree in upper division and graduate classes. These same professors are likely to have the most years of experience and therefore draw the largest salaries. There is a corresponding tendency to use lower-ranked faculty with less experience and correspondingly lower salaries to teach lower division courses. The wide use of teaching assistants by four-year undergraduate institutions in freshman and sophomore courses also results in decreased instructional costs at the lower division level.

Each state uses a different method to fund research. For example, The Alabama Commission on Higher Education (1991) uses two percent of the combined amounts for instruction and academic support plus five percent of the previous year's funds designated for unsponsored research as the amount to be spent on research. The National Association of College and University Business Officers and the National Center for Higher Education Management Systems recommended in 1981 that 9.2% of the instruction and allocation be spent on research and public service. Maryland has used 40 percent of sponsored research, South Carolina uses 25 percent of the prior year's sponsored research expenditures and Texas uses the number of full time equivalent faculty times $2000 to fund research.

Other factors sometimes included in the funding of research are faculty salaries or student teacher ratios (generally larger in freshman and sophomore courses than in junior, senior, and graduate-level courses). Information collected by the Coordinating Board indicates that lower division student teacher ratios vary from 12-1 up to 32-1, whereas upper division rations range from as low as 9-1 up to 20-1.

In funding academic support, Georgia uses 17.7 percent of instruction, research, and public service and Tennessee utilizes different percentages of the total amount calculated for instruction by institution type (3% for research universities, 1.7% for regional universities, and 0.8% for community colleges).

ORGANIZED ACTIVITIES RELATED TO INSTRUCTION

This category includes all expenditures for activities organized and operated in connection with the instructional departments and conducted primarily to give professional training to students, such as agriculture college creameries and demonstrating schools for teacher education.

Following are various approaches to funding organized activities related to instruction.

Virginia uses the following procedure in funding Instruction. It uses the projected FTE students by level and discipline divided by student faculty ratios (Teaching and Research). Instructional Administration is funded using the following ratios of administration to teaching and/or research position: 1 per 20 teaching and research positions for doctoral institutions; 1 per 35 teaching and research positions for regional colleges; 1 per 25 teaching positions for community colleges. To fund Administrative Support (Classified) Staff the following ratios are used: 1 per 4 teaching and research positions for doctoral institutions and 1 per 8 teaching and research positions for regional and community colleges.

Nevada uses a different approach to fund administration. A fixed number of professional and classified personnel for each college to provide support for the vice president for academic affairs and the academic deans' offices. Two professional and one classified position would be provided for the vice-president plus one professional and one classified position for each college/school.

The Maryland State Board for Higher Education (1982) proposed the following in their budgeting guidelines (FY 1984 Consolidated Capital and Operating Budget for Higher Education. p. 29).

SBHE Instructional Program Budget Guidelines

Instruction Method	Lower Division	Upper Division	Graduate	Graduate Research
LOW: Area Studies, Business, Computer Science, Interdisciplinary Studies	1.0	3.0	6.0	8.0
MEDIUM-LOW: Agriculture, Communication, Foreign Language, Health, Home Economics, Letters, Mathematics, Psychology, Social Science	1.5	4.5	9.0	12.0
MEDIUM-HIGH: Biology, Education, Engineering, Fine Arts, Physical Sciences	2.0	6.0	12.0	16.0
HIGH: Architecture, Library Science	2.5	7.5	15.0	20.0

New Mexico, developed another set of formulas to fund instruction.

NEW MEXICO PLAN FOR UNDERGRADUATE COURSES

Planning Centers	Lower Division	Upper Division
Biology, Physical Science, Fine Arts, Home Economics	Student/teacher ratio 18:1 Dollars per faculty position 32,000 Secretarial Support: 6,000 + 1,000*fac	Student/teacher ratio 15:1 Dollars per faculty position 40,000 Secretarial 6,000 + 1,400*fac
Business, Business Education, Communications, Languages	Student/teacher ratio 20:1 Dollars per faculty position 32,000 Secretarial Support: 6,000 + 1,000*fac	Student/teacher ratio 18:1 Dollars per faculty position 39,000 Secretarial 6,000 + 1,400*fac
Education, Health, Physical Education, Letters, Library, Science, Mathematics, Psychology, Social Welfare, Social Science, Interdisciplinary	Student/teacher ratio 24:1 Dollars per faculty position 32,000 Secretarial Support: 6,000 + 1,400*fac	Student/teacher ratio 20:1 Dollars per faculty position 39,000 Secretarial 6,000 + 1,600*fac

NEW MEXICO PLAN FOR GRADUATE COURSES

Planning Centers	Graduate
Biology, Physical Science, Fine Arts, Home Economics	Student/teacher ratio 10:1 Dollars per faculty position 42,000 Secretarial Support: 1,500*fac
Business, Business Education, Communications, Languages	Student/teacher ratio 12:1 Dollars per faculty position 41,000 Secretarial Support: 1,800*fac
Education, Health, Physical Education, Letters, Library, Science, Mathematics, Psychology, Social Welfare, Social Science, Interdisciplinary	Student/teacher ratio 15:1 Dollars per faculty position 41,000 Secretarial Support: 6000*fac

The Alabama Commission on Higher Education (1991) has used a Regular Academic

Program Formula involving a Class size of 26 for doctoral institutions and 24 for regional institutions. Lower Division Credit Hours were calculated at 95% of existing undergraduate weights and Upper Division Credit Hours were calculated at 105% of current undergraduate weights.

Remedial programs have received increased attention in recent years. Remedial programs are designed to prepare students to succeed in college and give them the opportunity to achieve academic or occupational goals. The Alabama Commission on Higher Education uses the aforementioned method to fund academic programs and uses an additional 21% increment in funding remedial credit hours. Tennessee gives community colleges and technical institutes an allowance of one percent of the total Educational and General (E&G) expenditures and the regional universities receive an allowance of 0.5% of the total E&G expenditures to fund their remedial programs. Other remedial programs use low student teacher ratios (often 15:1). The Educational Opportunity Service uses $55,000 plus $70 per headcount minority student as a recommendation in funding developmental/remedial programs.

Following are other items which need to be considered in funding organized activities related to instruction. (1) One graduate assistantship for every 5 FTE graduate students and one graduate assistantship for every 3.3 FTE doctoral students at a salary of $17,700 per year. (2) Five percent of the equipment budget is needed for equipment replacement. (3) An appropriate method of amortizing instructional and research equipment over time and providing for its maintenance needs to be developed. (4) An appropriate allotment for equipping new positions needs to be developed so that each new position is equipped properly at time of hiring. One recommendation for so equiping these positions would be $4,800 for administrative positions and $6.600 for clerical positions. (5) Forty percent of the faculty workload in the regular school year is being devoted to research and public service. (6) Summer school funding requires at least five

percent of instructional salaries to fund and year round funding needs to be considered so that summer school programs are adequately funded.

LIBRARIES

This category includes the expenses for all separately organized libraries, both general and departmental consisting of expenditures, salaries, wages and other operating expenses such as costs of procuring and maintaining the collections.

The Alabama Commission on Higher Education (1991) uses the following approach: Undergraduate $7.03/SCH; Graduate I (Masters) $14.12/SCH; Graduate II (Doctoral) $60.46/SCH; and Law $37.30/SCH.

Radford University in Virginia uses an eight variable approach for funding libraries. Those variables are: (1) Undergraduate credit-person hours; (2) Number of declared undergraduate majors; (3) Graduate Credit-Person Hours; (4) Number of graduate majors; (5) Average Cost Weighting (This variable is based on the average cost per item for books in the various academic disciplines); and, (6) Publishing Output Weighting (an index value which reflects the book publishing output of the various academic disciplines). Index values for each subject area are computed by dividing each average price listed by the largest average price listed. (7) Importance of Books over Serials which attempts to decrease funding selectively by departments for those for whom serials are more important than monographs. Index values ranging from .5 to 1 were selected by the Materials Selection Committee based on conversations with department chairmen, and the Committee's knowledge of library use in subject fields. (8) Local Library Use which adjusts the formula for use of the library. Index values ranging from .5 to 2 are selected by the Materials selection committee based on examination of circulation data and the experiences of library staff. After the allocation index values have been computed for each fund, these values are converted to percentages for application to funding. The index values are converted by

dividing each fund's index value by the total of all index values. This is used as a ratio to allocate proportions to departments against the total budget.

Nevada has a unique approach for funding library staff and acquistions. This information follows: The number of positions authorized to support library operations (excluding book acquisitions) is determined based on the number of library volumes at each campus. 0-500,000 volumes (50 positions at $32,000 per position including support funding). Every additional 16,000 volumes-1position at $32,000 including support funding. Books and periodicals are funded at 6.5% for each department. Library acquistions are funded in the following manner: 125*FTE Faculty+20*FTE Students + 610 * no of Baccalaureate or Associate Degree Programs + 10,000 * Masters with no doctoral program + Masters with doctoral program * 3750 + Doctoral Program * 31250. Multiply number of volumes by acquisition rate of 5%. Estimate cost at $45 per volume.

GENERAL ADMINISTRATIVE AND GENERAL EXPENSES

This category includes all expenditures for the general executive and administrative offices which serve the institution as a whole, as well as other expenditures of a general character not related to any specific division of the institution which is budgeted separately. In general institution expenses can be anything not previously included such as alumni affairs, legal services and campus wide services.

Generally there are two methods used in funding general administrative and general expenses FTEs and headcount. The Alabama Commission on Higher Education (1991) utilizes the following headcount funding procedure: 1,000 or fewer, $626.57 per headcount; 1,001 to 2,500, $316.47 per headcount; 2,501 to 3,999, $215.39 per headcount, for enrollments greater than 4,000: $356.22 per headcount for first 4,000; 4,001 to 8,000, $266.78 per headcount; and over 8,000, $239.95 per headcount.

Virginia uses the following in funding institutional support: Support Staff-4 plus 22.5 per

100 FTE faculty for all four-year institutions; 4 plus 10.5 per 1,000 FTE students for community colleges. Administrative Staff-3 plus 2.75 per 1,000 FTE students for doctoral institutions; 3 plus 3 per 1,000 FTE students for comprehensive colleges; 3 plus 4 per 1,000 FTE students for community colleges. On the other hand Tennessee uses the following approach in funding institutional support: Community colleges $200,000 plus $380 per FTE student, and Universities $460 per FTE (In addition, Tennessee also incorporated the following into funding within this category: Computing - 20,000+0.30*sch; Fiscal Operations - 30,000+3% of instructional salaries; and Logistical Services - 80,000+0.5*sch.).

In Texas general institutional expenses were a separately justified item in the requests. In Alabama, it was assigned a value of 2% of the sum of all requests with a base of $7,500,000 and then the following formula: for the first 4,000 students-$500*headcount; for 4,000-8,000 students-$420*headcount; and for 8,000+ students $325*headcount.

STUDENT SERVICES

This category includes all expenditures for administering undergraduate and graduate admission activities, processing and maintenance of student records and reports, student registration, counseling, and placement.

A typical method for funding student services is to provide $50,000 plus $1 per SCH. Tennessee uses a fixed rate ($284) per headcount student to calculate the request amount for student services, in addition, a fixed amount ($80,000 for community colleges and $600,000 for regional universities) was included for intercollegiate athletics. Alabama adopted only the graduated rate per head count enrollment, it follows: for 0-5,000 students, $250.00 per headcount; for 5-10,000 students, $200.00 per headcount; and for 10,000+ students, $175.00 per headcount.

Robert A. Huff was executive secretary for the New Mexico Board of Educational Finance. Under his direction a plan was initiated to fund student services. That plan is contained in the

table above describing the New Mexico plan.

ORGANIZED RESEARCH

This category includes all expenditures for research projects which are organized, budgeted, or financed separately from the instructional departments. The Texas College and University System believes that research *is essential to the continued development of our civilization and there is no way to predict the outcome of a particular project. Many members of university faculties wish to devote a part of their time to research and it is essential that they be able to do so. It not only keeps them alert and productive but adds each year to the store of knowledge. Research is the foundation for changes in society ranging from culture to technology and must be encouraged.*

Tennessee and Texas offer two approaches to funding organized research. In Tennessee, Research (Universities Only) fifty percent was distributed in proportion to the amount budgeted by each institution for research the prior year and fifty percent was distributed on the basis of sponsored research awards to each institution. In Texas, the amount recommended was a fixed percentage (70.0) of the result of multiplying an institutional complexity factor times the sum of faculty salaries (for each year of the biennium) plus five percent of the total expenditures for sponsored research during the base year. The institutional complexity factor was calculated by dividing total weighted FTE students (during the base year) by total FTE students, where total enrollments for three levels of instruction (undergraduate, master's and doctoral) and three graduate academic groupings (science and engineering, teacher education, and all other) were weighted to reflect instructional-program complexity. The formula is multiply an institutional complexity factor times Faculty Salaries for each year of the biennium plus 5 percent of sponsored Research funds expended during the base year times 70 percent equals dollar requests for Organized Research [The Institutional Complexity (IC) Factor shall be computed as:

$$IC=\frac{0.15U+(0.5M_1+0.1M_2+0.25M_3)+(6D_1+1D_2+3D_3)}{U+M+D}$$

where U is undergraduate FTES, M1 is Masters FTES in science and engineering, M2 is Masters FTES in teacher education, M3 is Masters FTES in all other programs, D1 is Doctoral FTES in science and engineering, D2 is doctoral FTES in teacher education, D3 is doctoral FTES in all other programs, and FTES is full time student equivalents.

EXTENSION AND PUBLIC SERVICE

This category includes all expenditures for activities designated primarily to serve the general public, including correspondence courses, adult study courses, public lectures, institutes, workshops, demonstration centers, package libraries, museums, and similar activities.

Different states allocate funds to extension and public service using a variety of methods. For example, Oklahoma provided three to four percent of instructional allocations for public service, depending upon institutional type; South Carolina provided 25 percent of the prior year's sponsored and nongeneral fund to public service expenditures. Alabama's funding formula for public service was two percent of the combined allocations for instruction and academic support. South Carolina used 25 percent of the prior year's sponsored research expenditures. Tennessee provided a fixed allowance per institution according to the following schedule: Community colleges/technical institutes an allowance of $50,000 for FTE enrollments up to 2,500 and $75,000 and for FTE enrollments over 2,500. Tennessee universities receive $100,000 or 0.5 percent of total E&G budget request.

PHYSICAL PLANT OPERATION AND MAINTENANCE

This category includes all expenditures for salaries, wages, supplies, materials, fuel and utilities, and other expenses in connection with the day to day operation of the physical plant and its maintenance. Seven major functions were often included in the definition of plant operations:

Building Maintenance, Janitorial Services, Ground Maintenance, Utilities, Administration, Police, Fire and Safety, and Refuse Disposal and Trucking.

Florida uses a comprehensive appoach for physical plant funding.

Minimum administration: Department director, assistant director, draftsman, 2 secretaries, accounting clerk, clerk typist. Additional staff: 1 assistant director at 2,000,000 gross square feet, 1 assistant director at 4,000,000 gross square feet, 1 engineer at 500,000 gross square feet, 1 engineer for each additional 750,000 gross square feet, 1 draftsman at 1,000,000 gross square feet, 1 additional draftsman for each additional 1,000,000 gross square feet, 1 additional FTE position for each 5,000,000 gross square feet. Administration expense budget of $0.04 per gross square foot.

Ground Maintenance: Basic complement: 1 Ground maintenance superintendent and 14FTE ground keeper for up to 5000,000 total gross square feet of space. 1 FTE ground keeper for each 45,000 gross square feet, 1 ground keeping supervisor for each 15 FTE ground keepers and 1 assistant superintendent for each 5 supervisors. Supplies budget of from $0.025 to $0.055 per gross square foot depending upon climate, soil conditions and so forth.

Campus Security: The basic security force is as follows for institutions up to 800,000 gross square feet of space: 1 superintendent and 10FTE security officers of various ranks. As the institution grows, additional positions are added as follows.

800,001 to 1,000,000 GSF	1 FTE per 80,000 GSF
1,000,001 to 2,000,000 GSF	1 FTE per 90,000 GSF
2,000,001 to 3,000,000 GSF	1 FTE per 100,000 GSF
3,000,001 to 4,000,000 GSF	1 FTE per 110,000 GSF
4,000,001 to 5,000,000 GSF	1 FTE per 120,000 GSF
5,000,001 to 6,000,000 GSF	1 FTE per 130,000 GSF
6,000,001 to 7,000,000 GSF	1 FTE per 140,000 GSF
7,000,001 and up GSF	1 FTE per 150,000 GSF

The Florida model also allows an expense budget of $0.01 per gross square foot.

The Alabama Commission on Higher Education (1991) funds Physical Plant and Custodial Services at a level of $3.60 per gross square foot of building space and General Institutional Support at a level of 14% of total of all items excluding utilities.

Texas uses the following in funding: **Custodial services** - Total square feet of E&G building space times a given rate ($1.07); Physical Plant - 190,000+5% of instructional salaries; Physical plant general services - SW(FTSE+7.8FTEE)+0.0028RCB (SW equals average hourly earning, FTSE equals full time student equivalent, and RCB equals replacement cost of buildings as calculated in the formula for building maintenance. The proposed formula is 0.2 times the sum of building maintenance, custodial services, ground care, and campus security.

Ground care and maintenance - average hourly earnings (0.7 total linear feet of perimeter of all buildings plus 122 total acres of lawns plus 0.5 fall semester head-count enrollment). Campus

security - Dollar rate based on head count plus FTE faculty and staff. In a proposal by Texas A&M University the number of custodial FTEs was equal to the gross square feet maintained divided by 14,000; the custodial supplies budget was equal to 10% of the custodial salary budget; and the ground maintenance budget was equal to 75% of [A(number of intensely maintained and used acres)+B(number of moderately maintained and used acres)+C(Number of minimally maintained and used acres)]+25% of [D(number of FTE students)+E(Number of FTE employees)]. The committee left the specification of the eight dollars per acre measures (A, B and C), the five dollars per FTE measures (D an E), and the development of a rationale for the 75%/25% split as matters for future study. In 1968 William Thomas from the School of lBusiness Administration at Midwestern University in Wichita Falls, Texas suggested the following approach: 1 FTE physical plant employee per 10,000 gross square feet of building space; 148 FTE physical plant employees are required for every 10,000 FTE student enrollment; and a $10,000 physical plant administration and general services budget is required for every six FTE physical plant employees.

The Kraft Formula uses the following in calculating the Annual Maintenance Budget. The Annual Maintenance Budget is equal to the Maintenance Cost Factor times the Current Replacement Cost of the Building(s). [Kraft identified three construction types each with its own Maintenance Cost Factor as follows: Wood-frame construction (1.75%), Masonry-wood construction (1.30%), Masonry-concrete or masonry-steel with concrete floors (1.10%).]

Evergreen State College (1970) offered the following suggestions for budgeting plant operation and maintenance:

> **Custodial Services:** 1 FTE Janitor for every 20,000 GSF, 1 FTE window washer for every 350,000 GSF, 1 FTE relief worker for every 12 formula FTE workers and 1 FTE supervisor for every 20 FTE employees. An allowance for equipment replacement was computed by allowing $0.0092 per gross square foot maintained per year.

Ground Maintenance: supplies budget was computed as 10% of the building maintenance allowance.

Weber and Weber from the University of Maryland (1972) used three unique components in their budgeting formula: (1) **Hours of Operation Curve:** Multiplier = $0.03H + 0.00023H^2 + 0.017LN(H) + 0.0000006H^3$; where H is hours of use per week;

(2) **Intensity of Use Line:** Multiplier=1.225-0.0015 G; where G is the number of gross square feet per FTE student; and (3) **Intensity of Landscape Development Line:** Multiplier=0.75+L; where L=decimal fraction of land covered by buildings. **[Optimum basic budget to which multipliers are applied:** FTE=GSF/8,000 and Annual Budget for the 4 Basic Functions=FTE x S x MSF where: GSF=gross square feet of space operated and maintained by the physical plant department; FTE is the number of FTE physical plant employees required to perform the four basic physical plant functions; S is the average annual salary and benefits; MSF is a factor for computing the materials and supplies component of the physical plant budget measured as a percentage of the total salaries and wages budget. Divide the total FTE (adjusted for Hours of Operation and Intensity of Use) into the four functional categories: Administration 5%; Building Maintenance 25%; Ground Maintenance 10% and Custodial Services 60%. Adjust the ground maintenance FTE for Intensity of Landscape development. Compute the budget for materials and supplies for each group by multiplying each of the four salary budgets by the following supply factors: Administration 8.7%; building maintenance 42.7%; ground maintenance 42.9% and custodial services 11.1%].

Following are several approaches to funding campus security: Dollar rate (Head Count plus FTE Faculty and staff; the Maryland formula uses 51,975+55.62 full time equivalent students; The Coordinating Board report (1978) suggests the following: Campus Security Services=A+B [A=4.5SW(FTSW+FTEE), for the first 8,000(FTSE+FTEE) and, B=3.8SW(FTSE+FTEE) for all (FTSE+FTEE) above 8,000 where SW is the average hourly earnings for services, FTSE if the full

time equivalent student enrollment; FTEE is the total full time equivalent employees.]; and California State University uses the following: The minimum security force is defined to be 6 FTE regardless of size. Security officer positions are determined as follows (including 1 FTE supervisor): 1 FTE for every 2,000 headcount enrollment for the first 10,000 headcount students; 1 FTE for every 3,000 headcount enrollment for headcount students above the first 10,000; 1 FTE for every 700,000 gsf of space; 1 FTE for every 150 acres up to a maximum of 2 FTE. It further recommends **Campus security clerical positions:** 0.5 FTE for headcount enrollments up to 10,000 students; 1 FTE for headcount enrollments above 10,000, and an allow 1 FTE additional groundman for every 12 FTE groundmen to allow for sick leave and vacation coverage.

NATIONAL TRENDS

To develop an adequate funding formula it is necessary to examine National trends. There are two aspects to that examination. The first part, a review of literature concerning funding formulas was described above. This section will present the results of an examination of National data. This section is divided into four parts: General Indicators, Cost Centers, Revenue and Trends in the Student Population. The **General Indicators** section will describe the characteristics of the 50 states and the District of Columbia relative to indicator variables which relate to higher education funding. The subsequent section, **Cost Centers**, describes the distribution of costs to various higher education cost elements. The distribution of revenue is described in the third section. The final section describes characteristics of the student population which has implications for funding formulas.

General Indicators

The indicators described in this section were selected based upon the previous review of literature as well as other indicators found by policy research studies to be related to funding and public policy. The source of the general indicator data was the 1991 special suplement of the

Chronicle of Higher Education which contained the most current indicator data. There are four categories of indicators which will be discussed here: Demographics, The Students, Expenditures and Revenues.

DEMOGRAPHICS

The fifty states in the United States and the District of Columbia represent a diverse population. The population of any particular state ranges from a minimum of only about one-half million (453,508) to a maximum of nearly thirty million people (29,760,021). The United States has the benefit of a relatively young population where nearly three out of four people (69.02%) are under the age of 44. Nearly one out of five (26.12%) people are less than 18, one out of ten (10.63%) 18 to 22 ("traditional" college age) and nearly one out of three (32.27%) are between 25 and 43 years of age. There is considerable age variance between states. Some states reflect an aging population where nearly two out of five (38.0%) are abover 44 years of age. In general, the populations dispurse themselves between an elementary/secondary age cohort (19.3% to 36.4% in this age group) to a 'baby boomer' cohort (29% to 39.3% between 25 and 44 years of age). The distribution of so-called 'traditional' college age students (18 to 24 years of age) varies between 8.8 and 13.6 percent.

The average American earned between $14,943 and $20,822 in 1990. The average income varied greatly (from $12,735 to $25,358) between the states.

High School Diploma. Somewhat less than one percent of the population of the country received a high school deploma in 1991. More than one out of four (26.13%) of the high school students dropped out of high school. The high school dropout rate varied from a low of one out of ten (10.4%) to a high of nearly one out of two (42.0%) of the high school students dropping out of school. The United States issued nearly four hundred thousand *General Equivalency Diplomas* (between 650 and 37,442 per state) in 1990.

College Training. Only one out of three (32.37%) Americans have attended (one to three years) of college. States range between a low of nearly one out of five (20.4%) to a high of nearly one out of two (44.1%) people who have attended college. Although there seems to be a large proportion of people who attended college, few have graduated. Only one out of six people (16.32%) in the average state holds a college degree. The proportion of people holding a college degree varies from a low of one out of ten (10.4%) to a high of slightly more than one out of five (27.5%).

Institutions. On the average, states have between eight and 326 institutions of higher education. Nearly half (43%) of the institutions are private or sectarian. In addition to colleges and universities, the average state contains nearly one hundred and forty (139) vocational schools. Some states provide no vocational training in vocational schools (0 schools in that state). Other states have a heavy focus on vocational training as reflected by one state with nearly one thousand (916) vocational institutions. On the average, every state contains one institution (0.92, between 0 and 6 institutions per state) that has been censured by the *American Association of University Professors* for some rules infraction. The average state awarded nearly twenty thousand (19,886) Bachelor' Degrees (ranging between 1,011 to 91,508 per state), six thousand (6,049) Masters Degrees (ranging between 286 and 34,442 per state), seven (701) hundred Doctoral Degrees (ranging between 0 and 7,651) and fourteen hundred (1,387) Professional Degrees (ranging between 0 and 7,651 per state).

Enrollment. The average state enrolls over one hundred thousand (111,302) students in public colleges, ranging from 12,335 to 494,009 students per state. On the average, each state enrolls 62,553 students in private colleges and universities, ranging from no (0) students to over half a million (566,648) private college students. The states enroll between twenty six thousand (26,148) and over a million and a half (1,546,687) undergraduates. The nearly thirty thousand

(29,698) graduate students in the typical state (ranging from 2,397 to 273,783 graduate students) is more than half of the average (46,049) first time freshmen which ranges from 2,397 to over a quarter million (273,783) first time freshmen per state. Will we begin to see nearly as much emphasis placed on graduate as freshmen education?

Political Structures. Forty five percent of the states had democratic governors and fifty six percent of the states claimed democratic U.S. senators. The average state claimed between 0 and 26 (average: 5.25) democratic U.S. representatives and between 0 and 19 (average: 3.25) republican representatives. The average statehouse reflects twenty four (between 0 and 46) democratic senators and sixty six (between 0 and 145) democratic representatives.

STUDENTS

There is a rich ethnic diversity in the college populations in the United States. Less than two percent (1.58%) of the college population are American Indians (ranging between 0.1% to 15.6% for different states). Three percent of the college population is Asian, nearly eleven (10.64) percent are Black and over five (5.37) percent are Hispanic.. There is a considerable variation in the proportion of college students in each state who declare themselves as Asian (0.4% to 61.8%), Black (0.3% to 65.8%) or Hispanic (0.5% to 38.2%).

That the rich cultural expreience which would evolve from a diverse student body, however, is somewhat abated by over three out of four college students (76.44%) going to school in the same state that they graduated from high school. The 'collegiate cultural diversity quotient' is higher in some states where only one out of three (36%) of student body went to high school in the state. Other states with nearly all of the student body (92%) graduated from high schools in those states reflect, essentially, no cultural diversity.

The proportion of minorities attending public institutions varies greatly from a low of less than two (1.5) percent to nearly the entire collegiate population, 94.6 percent. The proportion of

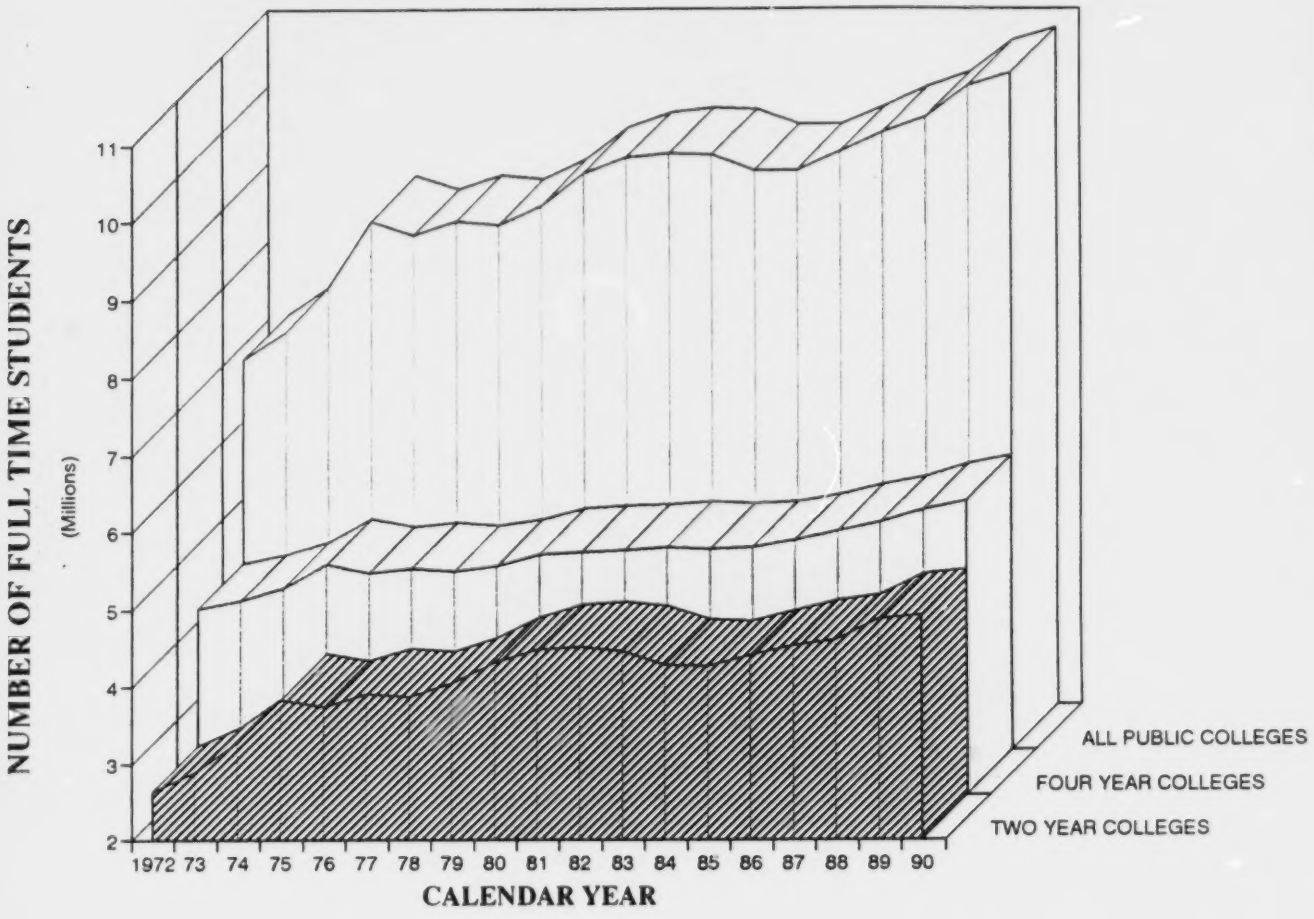
minorities attending private schools varies widely but not as greatly as that for public colleges. Between two and nearly forty three (42.7) percent of the collegiate population attending private schools are minorities. The average proportion of the public (15.47%) and private (15.14%) college populations who are minorities are nearly identical for the Nation as a whole. This indicates a wide diversity of either opportunity or access for minorities between states. At the very least it reflects a distinct variance between states with regard to equal cultural, ethnic and educational opportunities derived only from a culturally diverse population.

Changing Populations. A majority of the collegiate population (54.51%) in the United States are female. The proportion of female college students varies from a low of forty eight percet to nearly sixty (59.6) percent. *Less than two out of three college students (59.67%) are full time students.* The colleges and universities have been experiencing between no growth (0.5%) to a nearly sixty (57.1) percent enrollment growth. These factors may be indicate a need for change in higher education delivery and student support systems.

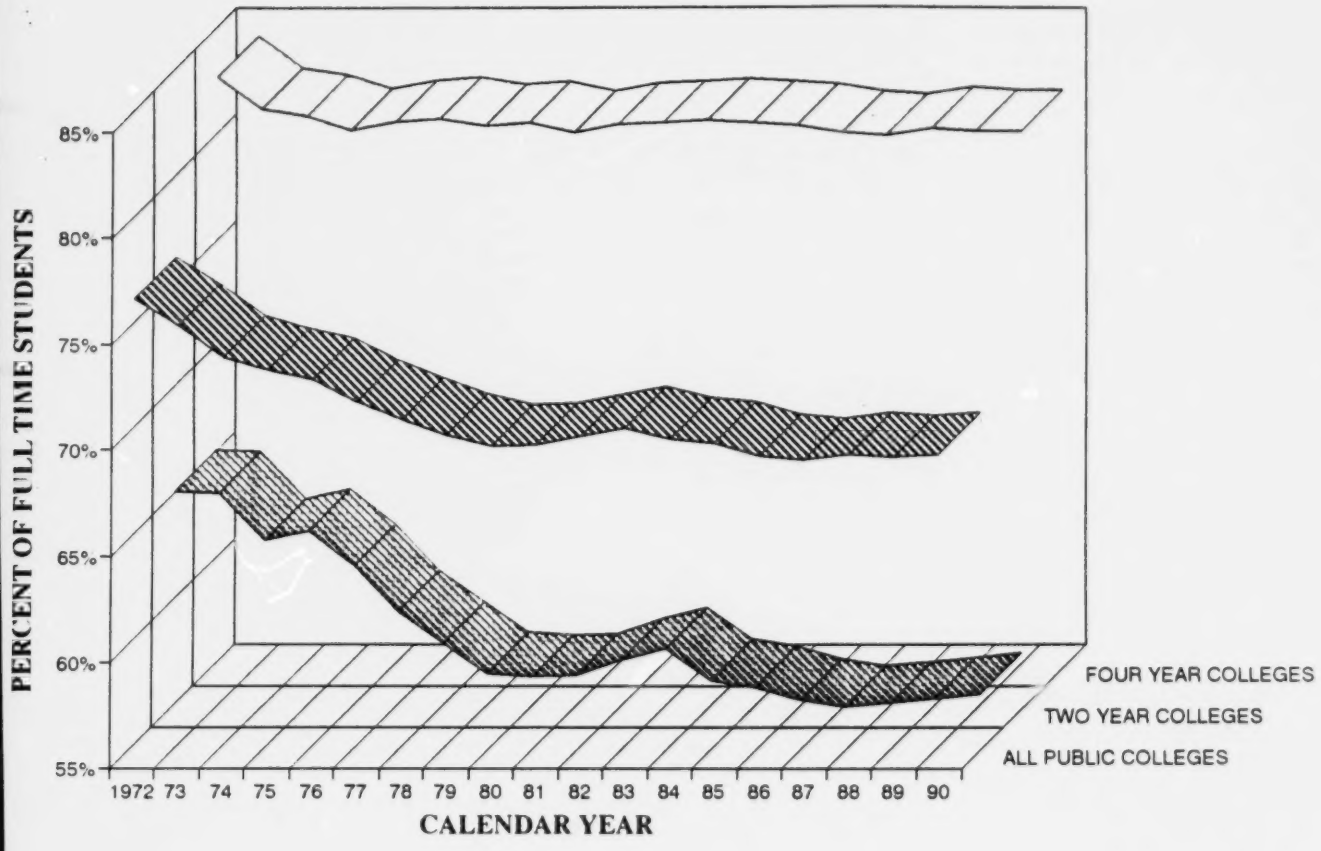
Less than two out of three (59.46%) college students had taken any type of admissions test. Some states are more stringent with a majority (81.0%) of their students having taken some form of admissions test. Other states, where only one out of three (36%) of their college students have taken some type of admissions test, are quite lax in this area.

Since 1956 the Nation has seen a twenty percent decrease in the Scholastic Aptitude Test Performance of college freshmen in both the Verbal and Quantitative areas. That decrease has been cooborated by the subtest and composite test performance of the American College Test. The only subtest that has shown any increase has been the social studies subsection of the American College Test. Therefore, the student population not only consists of an older group of students; but, the 'traditional' age group are less well prepared to deal with the rigors of the freshmen experience. There seems to be a definite need for greater emphasis on preparing students to cope

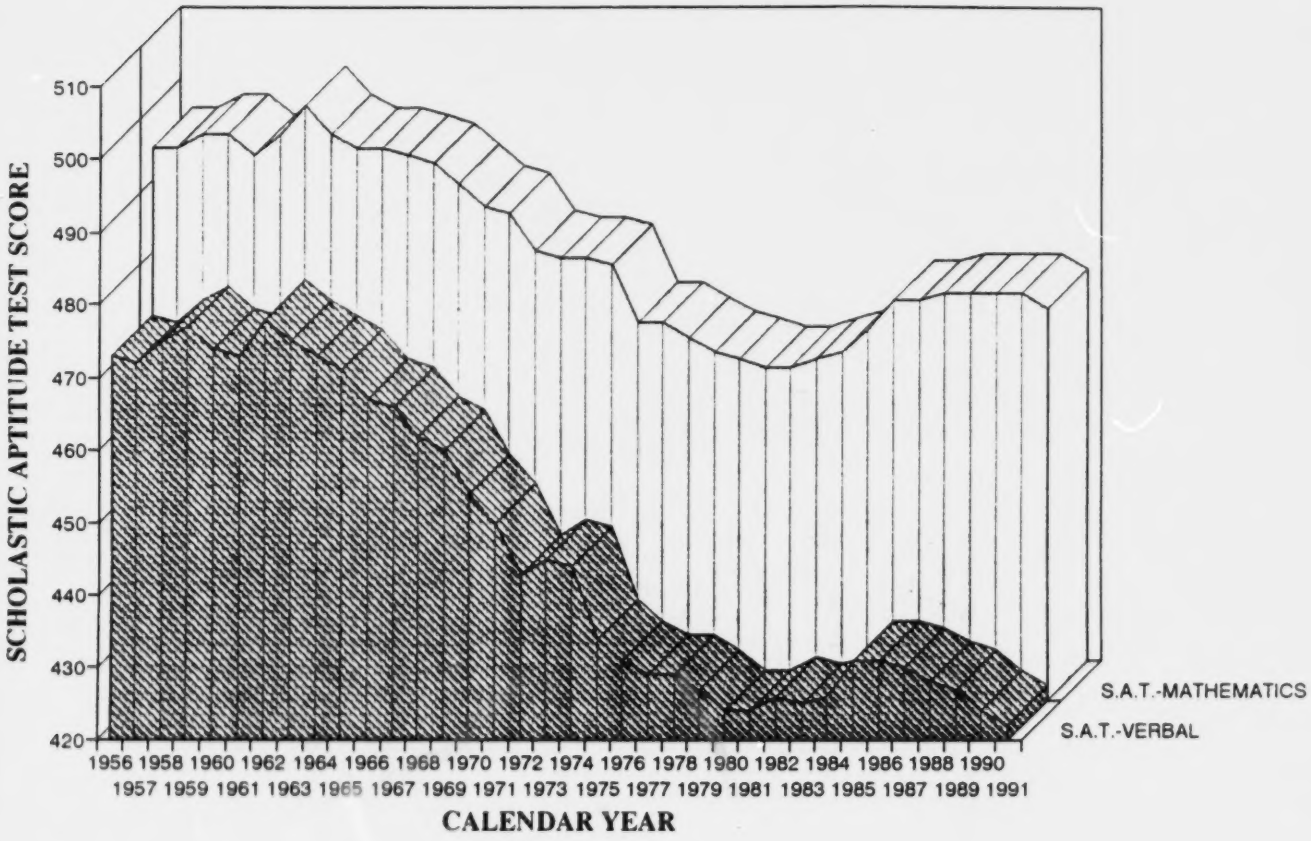
NUMBER OF STUDENTS IN PUBLIC COLLEGES



PERCENT OF FULL TIME STUDENTS IN PUBLIC COLLEGES



SCHOLASTIC APTITUDE TEST RESULTS FOR THE NATION FROM 1956 TO 1990



with the rigors of college in terms of developmental services for all students and remedial services for those in need.

EXPENDITURES

The average state employs over seven thousand (7,237) faculty members (ranging between 669 and 36,015 faculty members per state) and pays them an average of $40,137 (ranging between $30,975 to $52,765) in public colleges and $32,243 (ranging from $24,238 to $48,138) in private colleges. There is also a diversity in the number of faculty at each academic rank employed in each state. A more detailed examination of faculty distributions, salary, et cetera will be subsequently discussed.

The states expent between a little over eighty eight million ($88,462,000) and eight billion ($8,515,000,000) dollars in 1990 to operate public higher education. Each state expent between a little over two million ($2,448,000) and five billion ($5,594,000,000) to operate private colleges and universities. The average expense for public colleges was $1,221,000,000 per state compared to $686,857,780 per state for private colleges.

The states did not fund all of the expenditures. Each state appropriated an average of $801,720,000 ranging between $0.00 (District of Columbia) to $6,101,000,000 in 1990. The state appropriations did not match the expenditures. *The average state spent less than one percent (0.91%) of the total available personal revenue to finance higher education.* A more detailed discussion of expenditures will be subsequently presented.

Funding for Research. Nearly three hundred million dollars ($288,259,706) was expended by the average state on research. However, only eleven (11.3) percent (ranging between 0.4% and 39.4%) was funded by the state. Between one (1.1) and twenty percent (average 7.3%) was funded by the institutions themselves and more than half of the research (54.23%, ranging between 29.2% and 76.6% per state) was funded by the federal government.

DISTRIBUTION OF THE NUMBER OF FACULTY MEMBERS BY ACADEMIC RANK

ACADEMIC RANK	STATE AVERAGE	MINIMUM	MAXIMUM
FULL PROFESSOR	2,213	128	13,633
ASSOCIATE PROFESSOR	1,771	158	10,268
ASSISTANT PROFESSOR	1,734	164	9,540
INSTRUCTOR	429	50	2,019
LECTURERS	148	0	1,175
NOT CATEGORIZED	1,499	0	8,445

Student Aid. The average state spent over fourty million dollars ($41,781,059) on financial assistance directly to students. The range of state assistance was $241,000 to $439,124,000. The states gave between $241,000 and $408,000,000 (average: $33,404,580 per state) for between 307 and 330,630 (average: 27,479 students per state) need based scholarships. The average need based scholarship was about $1,400. The states awarded between $0.00 and $41,928,000 (average: $4,593,840 per state) to between 0 and 65,620 students (average: 5,200 students per state) for scholarships not based on need.

Federal Aid. The average state obtained nearly seven million dollars ($6,655,235) from federal G.I. Bill benefits (ranging from $511,000 to $35,564,000) and eighty million dollars ($80,019,627) from Pell Grants (ranging from $6,299,000 to $392,463,000). The federal government supported the average state with over one hundred and fifty million dollars ($151,009,882) in research money, ranging from a low of $4,851,000 to a high of $1,110,000,000. In addition, the federal government provided the average state with nearly twenty five million dollars

($24,703,451) in aid for vocational education, ranging from $2,407,000 to $110,652,000.

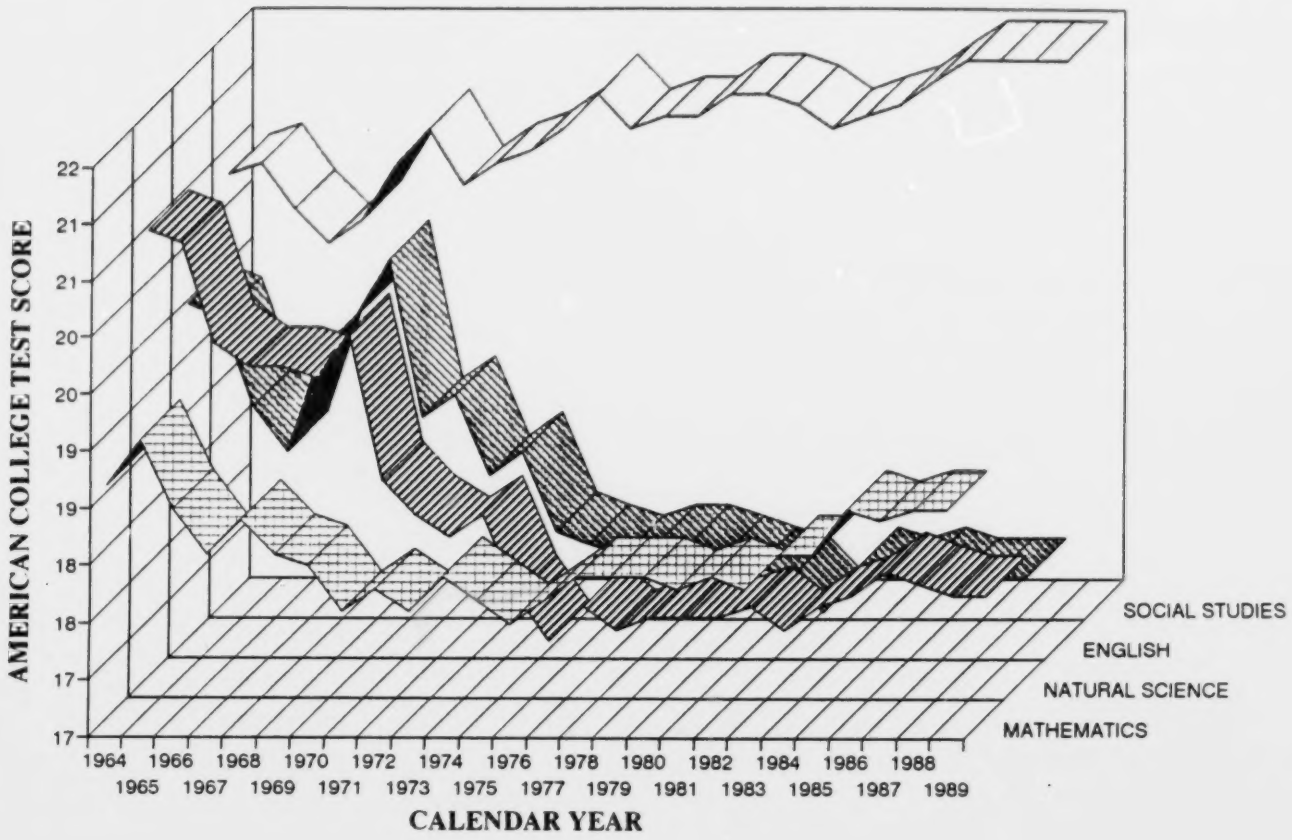
Tuition. The average semester tuition for a state school was $1,726 ranging up to $3,641. The average private school tuition ranged between $1,975 to $11,450 per semester. This index did not include the costs of books, room and board, et cetera. A detailed analysis of tuition, room and board expenses will be presented subsequently.

COST CENTERS AND REVENUE SOURCES

By far the cost of instruction is the largest cost element. Over one third of an institutional budget (34.16%) is devoted to this area. Other areas seem to be dependent upon the cost of instruction. As pointed out in the literatrue review section, this is a serious error and does not reflect the entire mission of higher education nor the realities of operating a physical plant. Details of a revised budget methodology which is not as dependent upon instructional costs will be discussed later.

The distribution of costs in 4-year public institutions are shown in Figure 1. In general, over the time frame from 1977 to the current time, public institutions of higher education have increased the relative importance (as reflected in budgetary allocations) to research and public service. Four year institutions fund research and public service at about sixty (60) percent of direct instructional costs. Some of those costs are abated by grants and contracts. However, the institution often funds research from state funds at about thirteen percent of instructional costs. In addition, four year and graduate institutions often fund public service at approximately five (5) percent of the cost of instruction.

AMERICAN COLLEGE SUBTEST RESULTS FOR THE NATION FROM 1964 TO 1989

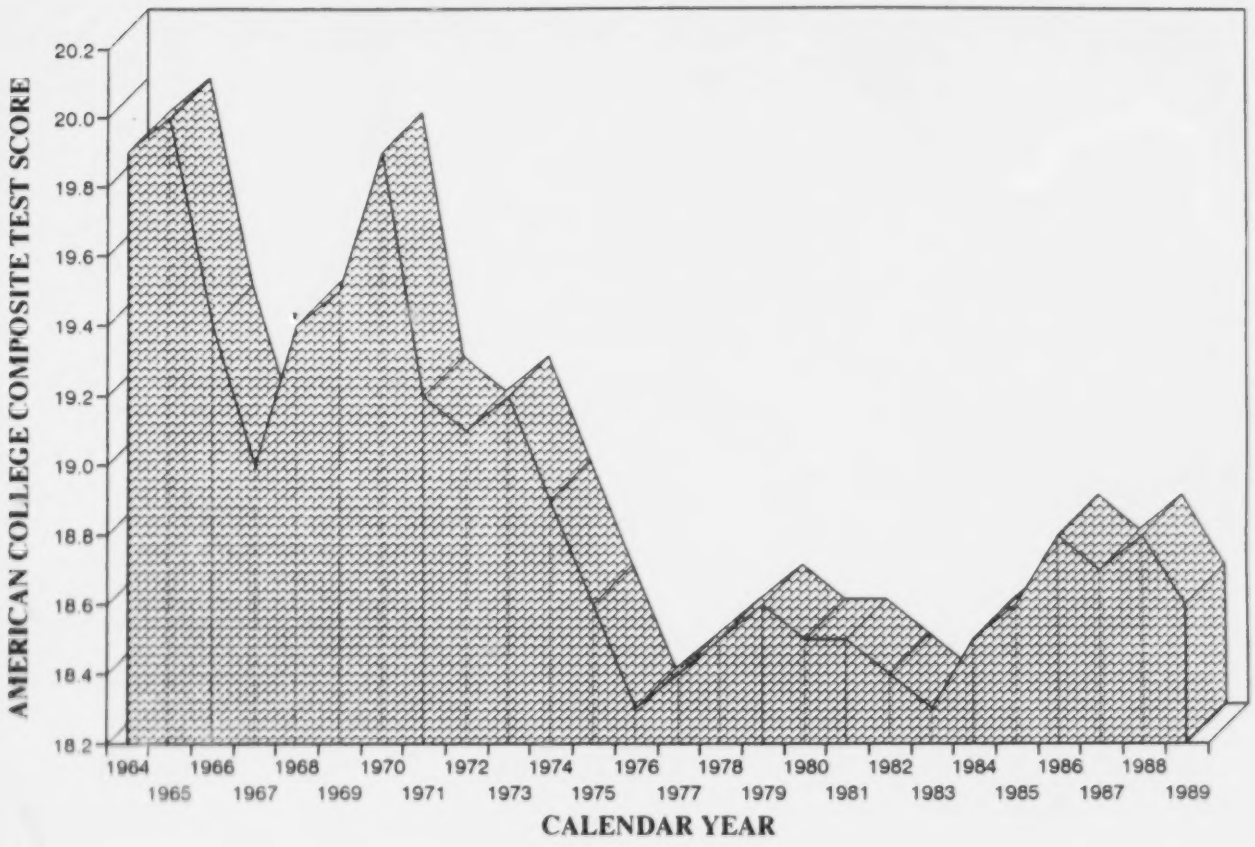


Libraries are funded at approximately eight (8) percent of the cost of instruction and student services are funded at approximately fifteen (15) percent of the cost of instruction. Institutional administration has remained relative constant at one quarter of the cost of instruction over the past twenty years. Academic support (academic administration) is often funded at the same level as general institutional administration and support services (one quarter of the cost of instruction).

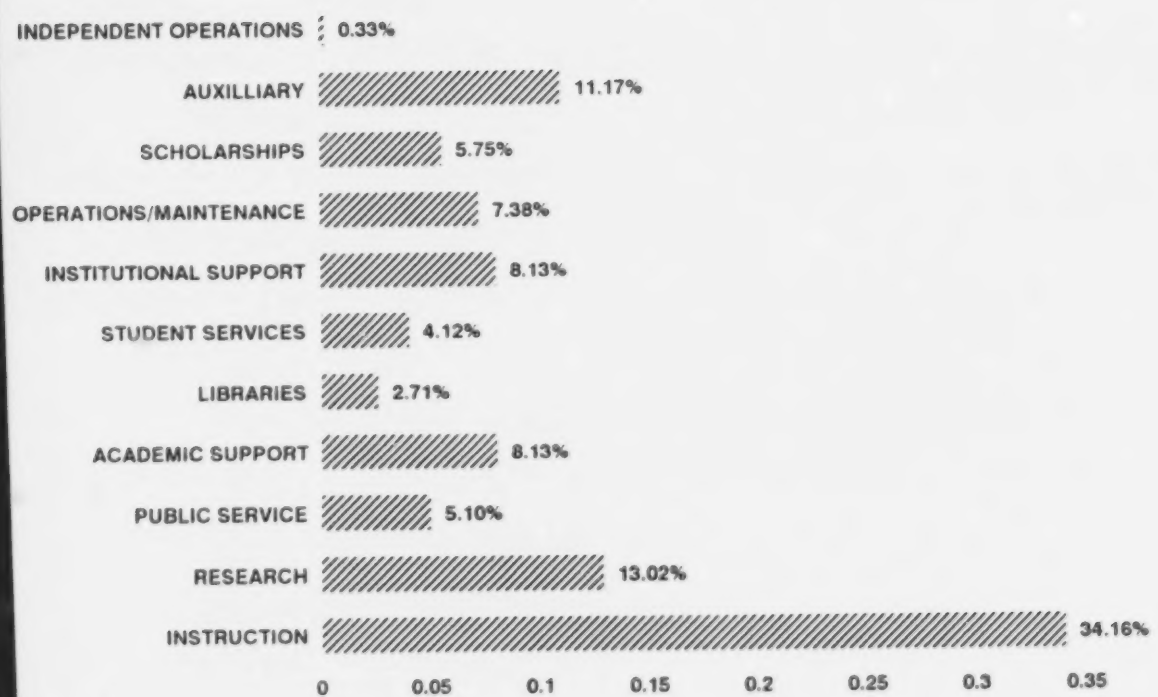
Operations and Maintenance is often funded at twenty (20) percent of the cost of instruction. Auxilliary services such as printing, marketing, etc. are often funded at one third of the cost of instruction.

Most institutions reserve approximately one sixth of the cost of instruction for institutional scholarships.

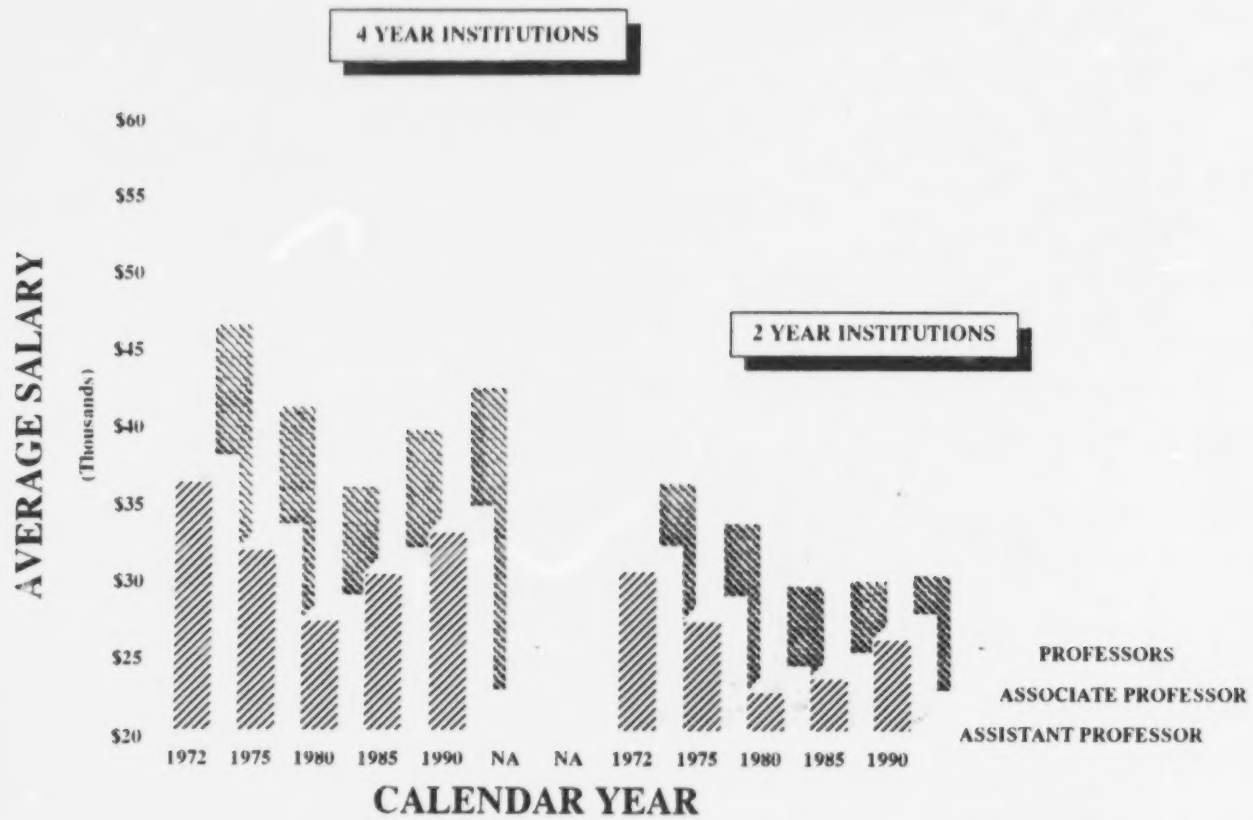
AMERICAN COLLEGE COMPOSITE TEST RESULTS FOR THE NATION FROM 1964 TO 1989



COST CENTERS 1991
4-YEAR PUBLIC INSTITUTIONS



FACULTY SALARIES AT PUBLIC UNIVERSITIES AGGREGATED BY FACULTY RANK



Salaries. Faculty salaries are a major cost determiner. Faculty salaries from 1972 to 1990 for both public four and two year institutions are shown by Figure 2. Because of the differences in background between two and four year college faculty as well as the heavy dependence upon research and scholarship at the latter institutions compared to only teaching at the former, there is a disparity between faculty salaries. As expected the major differences occur at the senior (full professor ranks). Because full professors at universities are expected to mentor junior faculty and be productive members of the academy their average salary ($58,000) is greater than the average for their two year college counterparts ($37,000). At two year institutions, associate professors as well as assistant professors have seen a decrease in salary over the past twenty year period while the salaries of four year faculty of the same rank have decreased to a low ebb in 1980, increasing to the current time. Associate professors earn, on the average, $42,000 at four year institutions and $32,000 at two year institutions compared to assistant professors at two year colleges who earn, approximately, $27,000 as opposed to $32,000 for their four year college counterparts.

The largest proportion of revenue (42%) is derived from state sources. That proportion has decreased over the past twenty years. Since 1981 colleges have derived nearly as much revenue from the sales of services and other aspects of their operation (26%). In addition, the federal contribution has remained constant at about twelve (12) percent. Student fees have also remained relatively constat at about sixteen (16) percent of the institutional revenues.

Undergraduate room and board at private institutions has nearly doubled since 1981 while public tuition has increased by a modest fifteen (15) percent. Furthermore, the ratio of public to private school tuition has decreased over the last fifteen years. In 1975 the cost of tuition at a public college was approximately half that at a private school (45.5%). In 1990, the tuition cost at a public college was approximately one third (36.5%) that at a private college. In so much as it can be assumed that real costs are reflected by the private sector and there has been no great

increase in nonfee based funds to public education, it is fair to conclude that programatic changes and priority shifts must have accompanied the lower reliance upon tuition. In order to retain relative parity, the public colleges would be required to increase tuition by four percent of the private school tuition for the next three years or two percent of the average private school tuition charge per annum over the next five years.

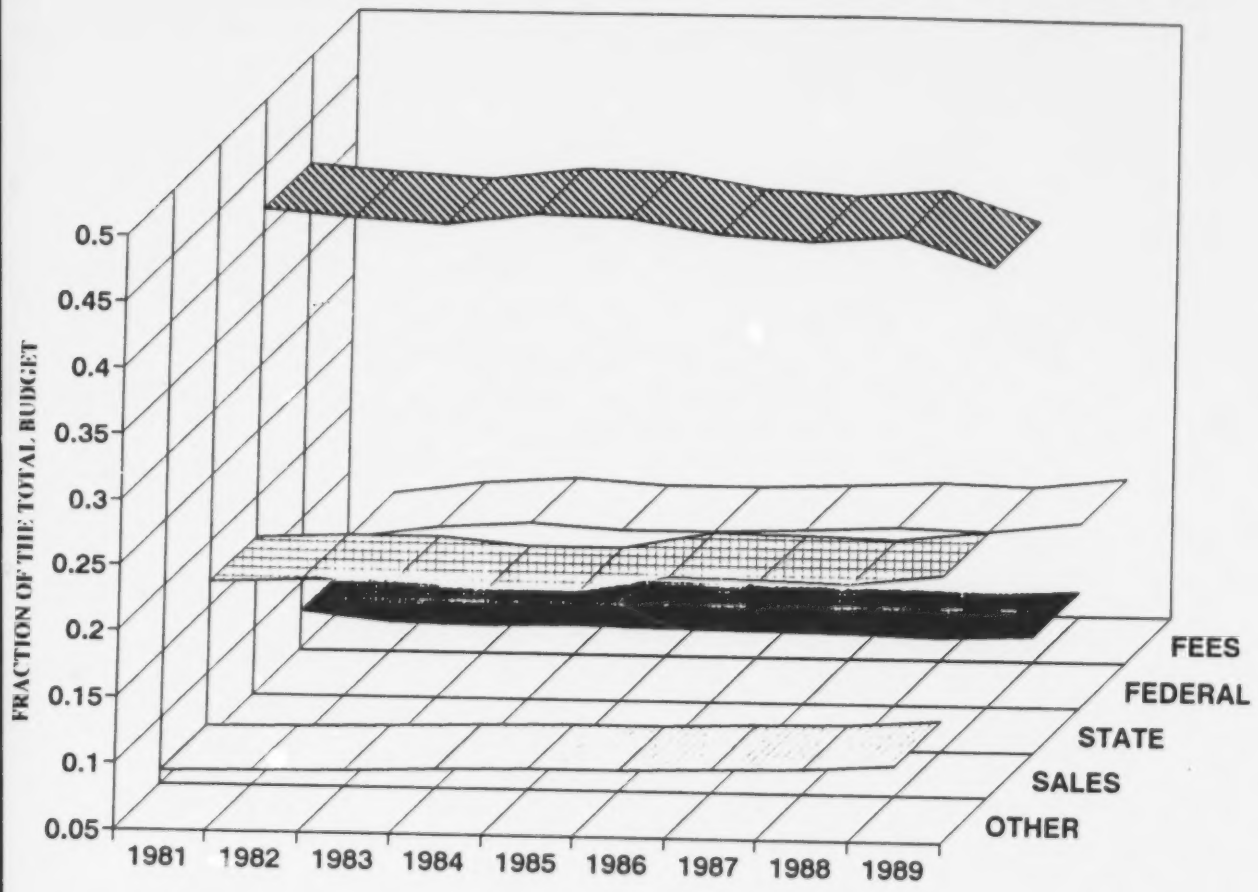
Laboratory schools. No data could be found on the cost of operation of laboratory schools. However, it seems reasonable that if laboratory schools are to maintain the Dewey tradition of experimental and innovative institutions, they should be funded at least as much as the average private school.

LABORATORY SCHOOL TUITION

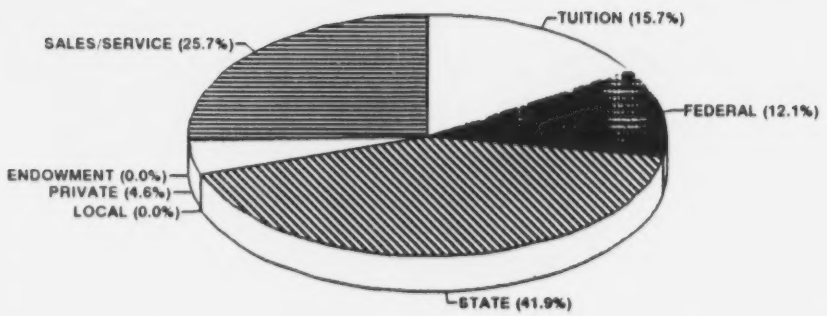
FUNDING CATEGORY	HIGH SCHOOL	ELEMENTARY SCHOOL
Special Education	$12,000	$10,000
Special Emphasis	$ 7,000	$ 3,500
General Curriculum	$ 4,000	$ 2,300

Of course, any contributions from the state for the general operations of schools should be subtracted from the tuition on a per student basis.

SOURCES OF REVENUE 1981-1990



SOURCES OF REVENUE 1991
4-YEAR PUBLIC INSTITUTIONS



LIMITATIONS TO PRESENT FUNDING FORMULAS

There are a number of problems with the formulas used to date to fund higher education. One is that the formulas use the student credit hour as a fundamental unit. The logic seems to be that the more students the more funds are necessary to operate a college or university. That logic is faulty for a number of reasons. Some of those reasons are:

- student credit hours reflect only a small fraction of the mission of higher education;
- student credit hours formulas assume that all programs treat all students in the same way;
- student credit hour formulas for instruction assume that a professors' salary should be based upon the number of students he/she directs when 40% or less of a professors' workload is devoted to teaching students;
- student credit hour formulas do not take into account the changing characteristics of the student population.

Another problem with these formulas is that they do not take into consideration growth factors. These formulas were developed in a time when the projections based on the size of the high school population indicated that the number of students would be declining. However, ever since that time the national statistics have not supported that projection. In fact, many institutions have experienced enrollment increases and others have experienced changing populations which require a different type of experience. The American Council on Education found that the eighteen to twenty-four-year-old cohort will decline in coming years; but fewer than half of the students currently enrolled in college are "college age." With that realization, colleges and universities are paying greater attention to the adult students they have, and are actively seeking ways to attract more. The formulas do not provide sufficient funds in advance to allow colleges and universities to plan for *future population growth or adjust delivery systems for different types of clients.* In

addition, more sophisticated teaching methodologies as well as technological enhancements have changed the face of the university without being reflected in the formulas. The problems concerning existing funding formulas will be amplified below.

The irony of budget formulas is that in many instances they work against the very purposes they were designed to serve, notably the improvement of educational services to society. Such improvement is not likely to occur without a continuous search for better ways to teach and learn-the distinctive mission of nontraditional education. There is a need to modify the fundamental assumptions underlying the formulas. *Funding formulas should be built to plan for the future not promulgate the failures of the past.* As Machiavelli pointed out in The Prince,

> *There is nothing more difficult to take in hand, more perilous to conduct, or more uncertain in its success than to take the lead in the introduction of a new order of things, because the innovator has for enemies all those who have done well under the old conditions and lukewarm defenders in those who may do well under the new.*

It is anticipated that the funding mechanisms described below will enrage some and delight others. They are presented as a mechanism of funding without political bias. We are aware that education, higher education in particular, functions in a political arena and that the proposed funding formulas will be evaluated in that context. It is our hope that they will lead to some new thinking and improvement of the current funding posture.

Many of the formulas reviewed above are based upon the student credit hour. The credit hour requirement is only one of several that place nontraditional programs at a disadvantage compared to traditional educational efforts. Basing funding for full time equivalent faculty on full time equivalent students is a practice that overlooks workload realities in some nontraditional programs. It has been found that almost as much faculty time and effort is needed per part time

student as per full time student. Since over 50% of the current student population is part time or nontraditional and that the retraining of adults is, perhaps, a more important societal priority than the education of the young, funding is not adequate to handle the real faculty workload.

Alternatives to the student credit hour formula have ranged from adding flat or percentage increments specifically for nontraditional program development to finding a more equitable unit of measure than the credit hour. Possible alternatives to the credit hour yardstick include student faculty contact hours, value-added achievement rates (which measure the "amount" of learning), and "Professional Service Units" (which measures a faculty member's complete academic workload rather than work which is directly linked to student credit hours). Others have suggested that formulas be replaced by a system of program budgeting that allows all programs to justify their existence and set their priorities by indicating the money necessary to carry out specific activities. Future formulas will shift away from enrollment-driven funding to entirely new bases grounded in cost data by function with refined price indices.

Beyond educating people, colleges and universities perform activities which produce very significant social benefits. These activities range from performing basic research to delivering health care. Planners at the state level should be aware of a structural shift in the financing of research with an increasing share of total investment in research funded by the institutions themselves for the greater good of the society. Those making decisions about state plans and budgets need to think very carefully about the proper balance of support when they are asked to invest state funds in higher education activities that benefit not use the state but the nation.

The emphasis of state support to higher education is not contained solely in the provision of learner instruction but is aggregated among many goals: the advancement of knowledge, the promotions of educational justice, the growth and appreciation of culture, the practical application of knowledge, and the critical evaluation of social performance. The Coordinating Board, Texas

College and University System recognized that the three functions are often ascribed to higher education-teaching, research and public service-are not separate but interdependent and complementary. Research is a basic component of good teaching, the source of new knowledge, and the means of producing scholars to carry on the work of expanding knowledge. The habits of mind necessary to function well as an educated person are also those fundamental to research: curiosity, the ability to ask relevant questions and the competence to find ways to progress toward answers. A good teacher develops these traits in students and exemplifies them in the approach to the field of study. Thus students and teachers are mutually involved in knowledge development. This process and interrelationship is especially characteristic of and fundamental to graduate education but can and should occur at all levels. It is vital to our society to develop research which originates technologies in accordance with social priorities. In a world where the consequences of rapid change in knowledge is so important the gap between the developed countries and the underdeveloped ones widens. Hence, there is a need to include a percentage for program development as a new category of funding formulas.

Other than the student credit hour, societal factors influence instructional costs and hence, the distribution of state appropriations. Some institutions or programs may be developed to meet the higher educational needs of specific clientele groups, such as American Indians, Blacks, Hispanics, refugees etc. or those with a particular individual characteristic, for example the hearing and sight impaired and the slow-learner. Equity in the distribution of state appropriations mandates the recognition of the particular purposes of an individual college or university.

Budget formulas based on historical expenditure patterns will tend to perpetuate whatever inequities exist within the historical data. Reliance upon historical expenditure patterns serves to proliferate prior, perhaps undesirable, behavior patterns. Institutions concerned with desegregation issues need to reexamine the assumptions upon which their funding formulas are

predicated. Funding formulas may serve to perpetuate past inequities that existed among previously segregated institutions of higher education.

There are three fundamental ingredients in an operational definition of equity. They are: (1) appropriation support based upon program costs; (2) appropriation support based upon work load; (3) appropriation support based upon a common definition of available income. In the near term, the present funding policies should be modified to include support for a funding formula by level of instruction and by program as cost data permits. An enrollment related funding formula should be modified and consideration given primarily to funding particular programs and services offered by colleges and universities apart from total enrollments.

There are good reasons to believe that some resource costs which are highly related to enrollment during growth are not as subject to being varied downward as enrollments decline, namely those of faculty with tenure and long term contracts. A program or institution can be funded on two different bases - one for fixed costs (those costs which cannot be changed in the short-run no matter how enrollment changes), and the other for variable costs (those costs that can be changed as enrollment changes).

The use of formulas during periods of steady or declining enrollments will always promote the formula numbers game unless funding approaches can be found which remove enrollment attributes. The Alfred P. Sloan Foundation funded a commission that proposed that formulas be based on a combination of a flat basic grant that covers a substantial part of each institution's overall budget with a per student allowance that provides the remainder where variable costs are enrollment predicated on FTE by degree type.

Many states have separated funding and quality assessment by providing funds while the institutions, by administrative and faculty review, have been responsible for maintaining quality. When this has broken down, state officials have usually vented their frustration by cutting budgets

- not providing incentives for quality improvement and assessments in the formulas themselves. Institutions should receive some income for educational results not simply for activities.

Rather than predicated upon student credit hours, formulas should be based on standardized workload measures which reflect the resource requirements for the attainment or maintenance of the level of quality specified in the missions of the institutions. Such a procedure will provide explicit recognition of the impact of appropriations/allocation decisions and inflation on the institutions and programs. For example, in most high quality institutions 40% of the faculty workload in the regular school year is devoted to research and public service. In accordance with the societal need for evening, weekend, summer, and continuing education programs at least 30% of a university budget should be allocated for these activities and year-round funding needs to be considered.

On the revenue side, tuition levels need to be examined since the total net costs to students and their families constitute one-third of total higher education costs. Additionally, the industries which reap the greatest benefit from higher education, other than through the tax base, contribute little directly to its support.

Studies of library costs have found that a substantial portion of library costs are fixed or not related to enrollment. The Wisconsin study found that fixed costs represented 67.1 percent of total library costs for four nondoctoral institutions. The formula for calculating the number of volumes depends more on the number and type of academic offerings than enrollment. Funding formulas that treat similar institutions alike have a "leveling" effect on institutional quality. Using a statewide average cost rate for a group of similar libraries benefits the ones below average and inadequately supports specialized libraries.

Tennessee has been experimenting with performance related funding and have established a set of guidelines for this type of funding formula.

- Formulas relating funding needs for the regular academic programs of the senior and junior institutions to student credit hours, faculty productivity, and faculty salaries.
- Formulas relating funding needs to current teaching procedures.
- Including a *Facilities Renewal Allowance* to estimate funds needed to age buildings.
- Updated values for ongoing research and service activities and other instructional activities not susceptible to "formula" determination.
- Meeting the needs of new programs and major changes in existing programs.

In some states, like Tennessee, a percentage of the base is set aside as a **quality improvement fund** for special plans or programs. Competitive grants are another example of quality encouragements. Quality improvements or incentives should be included as a part of the normal funding mechanism or formula. As institutions continue to evolve missions to meet the societal funding formulas will become more complex.

THE NEW FUNDING MODEL

There are many advantages and limitations to the present use of funding formulas. A major limitation that permeates all funding formulas is an over reliance upon the number of full time equivalent students (equivalently, the student credit hour) as a major determinor of funding. Use of the number of students as a funding determinor implies that the primary, if not sole, mission of higher education is to provide services to students. Classically, this has not been and will continue not to be the sole role of higher education. Funding formulas must take into account the fact that students must be served; but, not at the expense of other missions.

In addition to the varied mission of colleges and universities, most formulas do not take into consideration the difference between fixed and variable costs as well as the realities of

growth. If there were no students or faculty buildings would have to be maintained, heated and otherwise serviced.

There have been many harbingers of doom which have predicted decreases in the number of students entering colleges predicated upon projected numbers of high school graduates. Since the midseventies when the decline was to start until the present time colleges and universities have experience growth not decline. This is because, although the number of high school graduates have declined, the perceived need for a college education has increased resulting in a greater proportion of high school graduates attempting to enroll in college. Also, and as equally important, is the number of adults returning to college. At this time approximately twenty percent of the undergraduates are returning adults attempting to enhance their lives through the cultural and vocational foundations that higher education provides.

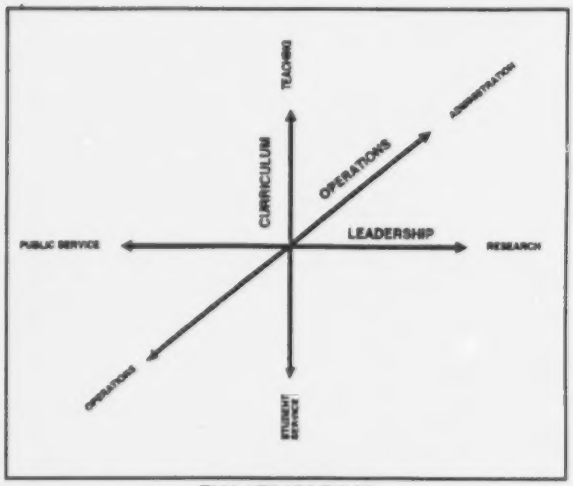
Funding For Growth. It would be easy to conclude that student credit hour formulas would take care of growth situations. However, *the realities of higher education preclude enrollment driven formulas from providing for the needs of the numbers of students it is predicated upon in an enrollment growth situation.* In order to acquire the services of an excellent professor it is necessary to hire two or three professors on a trial basis and use the tenure and promotion process to sift out the best. That process often takes between four and seven years. Classroom and dormitory space can not be provided for a student today if the funds to support that student arrives next year! It takes five to seven years for a building to go through the conceptualization, legislative appropriation, planning, construction and final approval process. Predicating current funding formulas upon current enrollment guarantees that services and facilities will never meet current needs. The enrollment portion of the formula needs to be driven by strategic thinking in terms of future growth and funding projects and faculty at least five years in advance of anticipated need in numbers concordant with predetermined curricula quality

standards.

Open Admissions. The nature and preparation of the student body has changed drastically over the past thirty years. The undergraduate is older and has been out of high school longer than thirty years ago. The composition of a large portion of the undergraduate class is composed of rift adults who are seeking career advancement as well as cultural enhancement, reentry women who may have been out of the workforce as well as formal schooling for sometime, and older men who have raised their families and are now seeking the careers or cultural opportunities that were denied them because of the demands of family or work. The recent high school graduate entering college today is more representative of the high school population than typical of the entering freshmen three decades ago. That recent high school graduate is, on the average, less well prepared than his/her counterpart only one generation ago. To deny an higher education to these individuals by instituting selective admissions would be a disservice to the society that colleges and universities, in part, are to serve. Also, to admit these students without providing the services they need in order to find success in meeting their goals (developmental education) is also a societal disservice and may be, legally, defrauding these students. Hence, higher education funding formulas must be predicated upon strategic models for growth which include a growth rate which is reasonable in terms of the individuals that an institution can service at a level of quality that the institution wishes to deliver considering that the mechanisms of curricula deliver must be much different for a changing population. When making the decision for open admission and the number of students that it can service it must consider whether admitting a student which it can not serve is worse than temporarily delaying a students education until the institution is prepared to properly education him/her at an acceptable level of quality.

The mission of higher education. Fiscal as well as day to day decisions can be

conceptualized in terms of three operational dimensions: Operations, Leadership and Curriculum. The operational dimension which includes physical, general and academic administrative functions support the two service delivery dimensions: Leadership and Curriculum. If an institution was performing no leadership or curricula functions there must be a basic administration to protect the investment. The industrialized world has seen great enhancements to the quality of life in this century. The assumption that the increase in the quality of life is due to industrial leadership is a ruse. The enhancement of the quality of life through technology emerged from products developed by and research conducted in colleges and university by the faculty. A major if not the most important contribution of our colleges and universities has been the development of new theories and products through applied as well as basic research. Certainly the industrial and business sectors need graduates to fuel the furnaces of finance and serving that need is a societal need. Curricula delivery, defined as preparing students, meets the last dimension. However, curricula needs must be kept in balance with the societal impact of faculty research and service.



DIMENSIONS
OF HIGHER EDUCATION

Each unit in the organization can be seen as serving one or more of the dimensions to different extents. An adequate funding formula for a unit should reflect the extent to which the unit reflects each of the dimensions of higher education. The remainder of this paper will describe a generic funding formula. That formula will be composed of subformulas for particular units and/or dimensions. The proposed formula does not include special purpose projects such as the

construction of buildings or the development of special purpose research or learning laboratories. Special units such as research/learning laboratories are assumed to be funded through some special appropriation process and on a project management basis. Once the laboratory or building is developed or constructed, the staffing and maintenance of the facility is subject to the details in the following formula process. The proposed formula is not designed to apply to special purpose (medical, agricultural and law) schools which, due to their unique missions, may require particular salary and other funding levels.

The effective operation of a higher education system requires more than merely funding institutions. Institutional efforts must be coordinated so that they behave as a unified system whose purpose is to serve a societal mission for a particular state or region. Institutions without oversight boards tend to become selfserving and narrow focused or try to be all things to everyone. There is a definite board for a coordinating agency which stimulates growth and change through a sense of societal need and coordinates the activities of the institutions in order to optimize service delivery. A separate section will be devoted to the funding of central coordinating bodies.

CURRICULUM DELIVERY AND CURRICULUM RELATED RESEARCH

In this section curriculum delivery is considered to be composed of an organic symbiosis of teaching and student services. Teaching is defined as facilitating student learning. In this sense and as traditional, research and public service plays a central role. The academy provides a means for students to learn by association with the top people (professors) who are actively working in their fields. There is a difference between instruction and curriculum delivery. For the purposes of this paper, instruction is defined as a specific activity (in either a classroom or laboratory) which engages the student for a brief amount of time (a few minutes to a semester) through which the student will attain one or more particular skills (attain mastery of a particular

objective or the content of a particular course). The curriculum is defined as a global interaction between experiences, activities, personal contact, academic and interpersonal advising which result in the eclectic individual who has a global perspective on the problems of today's society and is capable and motivated to make a substantive contribution to the enhancement of the human condition. Instruction is the province of a particular course or subject area. Curriculum is the province of the entire university and involves all academic departments, student services and each individual faculty member as well as each student.

The curriculum is considered to involve four components of two dimensions of the organizational mission. The curriculum is considered to involve the research and public service components of the leadership dimension as well as the instruction and student service components of the curricula dimension.

In order to derive a formula for curricula delivery each institution must define what is ment by quality. One component of quality is the average class size which equates to the student to faculty ratio and all associated cost elements. The research has indicated that average class sizes varying between a low of 14 and a high of 18 (average of 16) provide for optimal learning (Hashway, 1988, 1990). Although each institution must define quality for itself, for the purposes of this formula the following class sizes are assumed to be appropriate. Courses at the junior college and lower division undergraduate levels often have more students, due to attrition, than advanced courses taken in the last two years of the undergraduate program. Courses at the upper undergraduate levels often require more intensive participation by both student and faculty than the core curriculum or general distributional requirements in the lower level undergraduate program. There is a continuum of increasing involvement by both the student and professor from the early undergraduate through the upper undergraduate and graduate levels on to the doctoral level. That continuum should lead to a high degree of mentorship at the graduate level and a

highly individualized program at the doctoral level. The distribution of class sizes proposed above are intended to meet that goal.

TYPE OF INSTITUTION	RANGE OF CLASS SIZES	AVERAGE CLASS SIZE	AVERAGE NUMBER OF COURSES PER YEAR
JUNIOR COLLEGES	14-18	16	8
UNDERGRADUATE (LOWER DIVISION)	14-18	16	8
UNDERGRADUATE (UPPER DIVISION)	7-10	8	6
GRADUATE I	3-12	8	6
GRADUATE II (DOCTORAL)	4-10	7	6

The role of a faculty member varies by institution. The time commitment to research and public service versus classroom instruction depends upon whether a faculty member is at a junior college or at a doctoral institution with gradiations between all levels. Although each program and institution must make decisions predicated upon unique missions, the following suggestions are presented as a guide. The number of courses per year per institutional type was calculated based upon the assumption that should a faculty member not be involved in research he/she would teach five courses per semester or ten courses per year. Thus, predicated upon the suggested research/teaching ratios a faculty member at a junior college might be expected to teach nine courses a year while a doctoral faculty member might teach four courses in that same year.

It must be made clear that the research/teaching ratio corresponds to institutionally supported research only. It represents the commitment of the institution, albiet the society, to self improvement. Externally supported research and public service is expected to increase the ratio of research to teaching time. A faculty members salary associated with externally sponsored research or public service is expected to be included in that external budget and not impose a cost loading upon the institution.

FACULTY WORKLOAD DISTRIBUTION

INSTITUTIONAL TYPE	RESEARCH PUBLIC SERVICE	TEACHING	ANNUAL COURSE LOAD
JUNIOR COLLEGE	10%	90%	9
UNDERGRADUATE	20%	80%	8
GRADUATE I	40%	60%	6
DOCTORAL	60%	40%	4

Certain publics may view the distribution of research time for graduate and doctoral faculty not in line with the educational mission of a particular institution. This is not the case. Faculty time dedicated to research and public service is in line with institutional mission because research and public service should be a part of every institution' societal mission. Secondly, although a graduate or doctoral faculty member' time is partitioned toward research and public service he/she is still teaching while engaged in that activity. The association of graduate students with faculty who are actively engaged in research is an educational activity, perhaps, more effective in achieving educational goals than classroom lectures. Research and public service is teaching.

It merely occurs in a different way and, perhaps, in a different place.

These ratios result in average student to faculty ratios of 1:18 at the junior college, 1:16 at lower level undergraduate courses, 1:8 in upper division undergraduate courses as well as graduate courses and 1:5 at the doctoral level. To calculate average faculty salaries and the cost of the faculty it is necessary for an insititution to determine the distribution of faculty by rank. That distribution is related to the institutional mission. It is suggested that that distribution be determined by a governing body and apply to insititutions of particular types. The following percentage distributions are suggested guidelines and considered reflective of each institutional type. Nine month salaries are predicated upon National averages.

AVERAGE FACULTY SALARIES BY RANK AND INSTITUTION

	FULL PROFESSOR	ASSOCIATE PROFESSOR	ASSISTANT PROFESSOR
Jr. College	$ 35,000	$ 30,000	$ 26,000
Others	$ 57,000	$ 43,000	$ 33,000

The perstudent cost for faculty would be $1,650 at the junior college level, $2,480 at undergraduate level I, $5,225 at undergraduate level II, $5,600 at the graduate level and $9,320 at the graduate level. These per student costs for faculty do not include fringe benefits or other costs associated with quality teaching and learning.

In addition to salary, faculty members require basic supplies such as paper and zerox. It is suggested that an allowance of three hundred dollars per year per faculty member would supply that faculty member with sufficient paper and zerox supplies to support teaching and/or research in concordance with the above proportions

HYPOTHETICAL DISTRIBUTION OF FACULTY BY INSTITUTIONAL TYPE AND MISSION

	RANK	Jr. COLLEGE	UNDER GRAD I	UNDER GRAD II	GRADUATE	DOCTORAL
TWO YEAR	FULL	20%				
	ASSOC	50%				
	ASSIST	30%				
FOUR + YEAR	FULL		20%	20%	20%	40%
	ASSOC		20%	50%	40%	40%
	ASSIST		60%	30%	40%	20%
AV. SAL. (X1,000)		$29.8	$39.8	$41.8	$42.8	$46.6

Each faculty member requires support in order to execute his/her responsibilities. That support consists of clerical, undergraduate aids and graduate fellows. Each insitution will have to make decisions concerning distribution of support personnel. Suggestions are contained in the following chart. Clerical employees are considered as typists at a salary of approximately $14,000 per year plus benefits. Undergraduate aids are considered in terms of full time equivalents (40 hours per week) at a rate of $4.50 per hour or, equivalently, $9,300 per year. Graduate fellows are considered in terms of full time equivalents (40 hours or more per week) at an annual rate of

approximately $20,000 at the doctoral level adn $12,000 at the Masters level.

CURRICULA SUPPORT PERSONNEL

(FULL TIME EQUIVALENTS PER FACULTY MEMBER)

	CLERICAL	STUDENT AIDS	GRADUATE FELLOWS
Jr. COLLEGES AND UNDERGRADUATE	0.125	0.50	0.00
GRADUATE	0.250	0.50	0.50
DOCTORAL	0.500	0.50	1.00

Faculty development. Faculty development is important to the vitality of a college or university. It is important to the mission of the institution that faculty attend conferences and training sessions. A good portion of that responsibility must be with the faculty members themselves. However, the institution should provide incentive. It is suggested that partial incentive at the junior college, undergraduate and masters levels would be $500 per year and $1,000 per year at the doctoral level.

Research support. Faculty members who publish an average of one book and six papers every three years in refereed journals should be supported for their efforts toward the improvement of teaching and the reputation of the institution and the state as well as the society in general. It is suggested that a $5,000 per annum budget be assigned to each faculty member meeting these qualifications. It seems reasonable to assume that five percent of undergraduate faculty, fifteen percent of graduate faculty and twenty-five percent of doctoral faculty would meet this criteria.

Curriculum Administration. As in any business, colleges and universities require

administrators. Since the faculty assume much of the administrative load in any department, the eight workers to each administrator ratio commonly used in business, perhaps, does not apply. It seems that a ratio of sixteen faculty members to each administrator better reflects the management role of the faculty. To be an effective leader, the adminsistrative head or director should be able to hold the respect of the faculty. It is suggested that that head be tenured, experienced and or associate or full professor rank. The salary level is a matter of faculty and institutional perview and may be as much as the salary of a full professor plus twenty-five percent. Of course, each administrative unit requires a clerical aide and supplies ($2,400 per administrator is suggested) and travel ($1,000 per administrator is suggested).

Laboratories and Media Centers. Each campus has a set of laboratories for education, science, performing arts, engineering, psychology, etc. as well as media centers. It is suggested that a structure needs to be established to administer these units with a director, a technician and clerical support person for the campus as well as two undergraduate assistants that will provide sixty hours of service per laboratory and media center. Equipment should be amortorized over a five year period. Twenty percent of the cost of the laboratory and media center equipment should be included as an annual equipment replacement and maintanence fund. A general supply budget similar to two faculty members (i.e. $1,200 for laboratories and $2,400 for media centers) would be needed.

Student Services. Student services are vital to the overall development of the individual. There is a need for personal and academic counseling, admissions services, daycare for mothers and fathers who are also parents, financial aid counseling, placement, etc.. It is suggested that similar to Tennessee, $50,000 be allocated as the base supplemented by $1.00 per student credit hour.

Program enhancement. Each academic unit is always in need of improvement. The

changing nature of the knowlege base requires curricula enhancement. Five percent of the curricula budget seems average for this activity.

Summer School. The population of students has been changing over the past thirty years. Today's student is **not** eighteen to twenty one and dependent upon summer work to pay for tuition. Today's student is an adult with, perhaps, work responsibilities. Society as well as these 'new' students are interested in optimizing their time in college. The summer vacations were useful in an agrarian economy. Today, there is no need to plow the fields. This formula assumes that the academic year and all academic contracts are eleven month contracts and that the university is open for business year round. The concept of a separate summer school should be relegated to history books, not operational plans or funding formulas.

LEADERSHIP

The two components of leadership are research and public service. This is a vital part of the university program. The leadership role is a dimension of university finance which is often not or minimally funded with emphasis going to teaching and student services. This category includes all expenditures for research, development and public service projects which are organized, budgeted or financed separately from the instructional departments and not funded externally. Leadership *develops an infrastructure for the promolgation and continuation of the culture and civilization. Research keeps faculty alert and productive and, each year, builds the storehouse of knowledge serving as the basis for cultural and technological societal change.*

The leadership role should be separately funded. The Texas formula takes into account the 'complexity' of the university is an interesting approach. A differential weighting of the research needs physical and social sciences, performing and production arts as well as education as opposed to mathematics and the humanities is suggested. The 'complexity' factor that we propose is different from that used in the Texas formula.

$$COMPLEXITY = \frac{0.15U + \frac{50M_1 + 10M_2 + 25M_3}{100} + 3(2D_1 + D_2 + D_3)}{U + M_1 + M_2 + M_3 + D_1 + D_2 + D_3}$$

Proposed Institutional Complexity Factor

COMPLEXITY FACTOR PARAMETERS	
U	The number of undergraduate FTE students.
M_1	The number of FTE first level graduate students enrolled in education, psychology, social and physical science and engineering programs.
M_2	The number of FTE first level graduate students enrolled in performing or production arts programs.
M_3	The number of FTE first level graduate students enrolled in all other programs.
D_1	The number of FTE doctoral students enrolled in education, psychology, social and physical science and engineering programs.
D_2	The number of FTE doctoral students enrolled in performing or production arts programs.
D_3	The number of FTE doctoral students enrolled in other programs.

$$FUNDSFORINSTITUTIONALRESEARCH = COMPLEXITY * FACULTYSALARIES$$

FORMULA FOR CALCULATING INSTITUTIONAL (UNSPONSORED) RESEARCH BUDGET

Extension and public service. This category includes all expeditures for activities designated primarily to serve the general public includig correspondence and adult study courses, public lectures, institutes, workshops, demonstration centers, museums and similar activities. **Intercollegiate athletics is included in this category.**

It is suggested that nonathletic programs be funded at community colleges at a base of $50,000 for enrollments up to 2,500 and $75,000 for enrollments over that amount. Universities would be funded at $100,000 plus 0.5 percent of the instructional budget. Intercollegiate athletics would be funded at $80,000 for community colleges and $600,000 for universities.

LIBRARY

The library serves all of the functions of higher education. As such it deserves a separate budget category and corresponding formula. As in Nevada, it is suggested that the number of trained and certificated librarian positions required to operate a library is a fixed expense and calculated using the following formula:

LIBRARY STAFFING FORMULA

1. Up to 50 positions are required for up to 500,000 volumes. i.e. a library with 100,000 volumes would require 10 librarian positions. For budgetary purposes, assume $32,000 for each position plus fringe benefits.
2. One additonal professional librarian would be required for each additional 16,000 volumes.

In addition to this formula, a full time assistant ($16,000 part time, without benefits) would be provided for every 2.5 professional librarians.

Acquisitions. In addition to staff, libraries must be enhancing their collections. We suggest an aquisition formula which takes into account the complexity of the institution.

$$ACQUISITIONRATE(VOLUMESPERYEAR)=6.25PERFTEFACULTYMEMBER+1PERFTESTUDENT$$

It seems safe to assume $50.00 as an average cost per volume. In addition, 6.5% of each department personnel budget is suggested for periodicals as well as books purchased for special purpose departmental libraries.

OPERATIONS

There are two categories of operational expenses: administration and physical plant. Administration consists of Academic and General administration. Academic administration above the departmental level has not been included on the academic side of the equation. Academic

administration above the departmental level is considered to be an administrative not academic function and is included in this segment. General administrative and general expenses includes all expenditures for the executive and administrative offices which serve the institution as a whole including alumni affairs, legal services and other campuswide services. Physical plant operation and maintenance includes all expenditures for salaries, wages, supplies, materials, fuel, utilities, etc. for the day to day operation of the university.

As research and public service, the general administration of the university must continue regardless of wether or not any students attend the institution. The proposed administrative structure of the university will consist of an executive staff and line administrators. The executive officer (president) is responsible for all university operations as well as representing the university to appropriate publics. The proposed structure, common to most higher education institutions, consists of five vice presidents:

- academic affairs
- administration
- finance
- strategic planning
- student services

Each unit will be described. In order to have consistancy between formulas the following definitions and assumptions are made:

The executive office: The office of the president consists of an Executive Vicepresident who is a doctoral level professional that assists the president with all administrative functions. In addition, the executive vicepresident interfaces with the public relations departments and alumni affairs. Reporting to the executive vicepresident is the director of alumni affairs and the director of public relations each with a secretary. In addition, the office of the president is staffed by one administrative and one executive assistant as well as a receptionist and three secretaries. It is projected that $25,000 should be allocated for travel and an additional $25,000 for office supplies,

PARAMETERS FOR OPERATIONAL FORMULAS

1. The salary of an associate to an administrative officer will be, at maximum, eighty percent of the salary of the administrative officer.
2. When professional personnel report in a line to an administrative officer who is assisted by an associate the salary associated with each professional staff position will be, at maximum, sixty four percent of the salary of the administrative officer.
3. When professional personnel report in a line to an administrative officer not assisted by an associate the salary associated with each professional staff position will be, at maximum, eighty percent of the salary of the administrative officer.
4. AA=salary of an administrative assistant; EA=salary of an executive assistant; CO=sallary of a coordinator; RE=salary of a receptionist; SE=salary of a secretary.

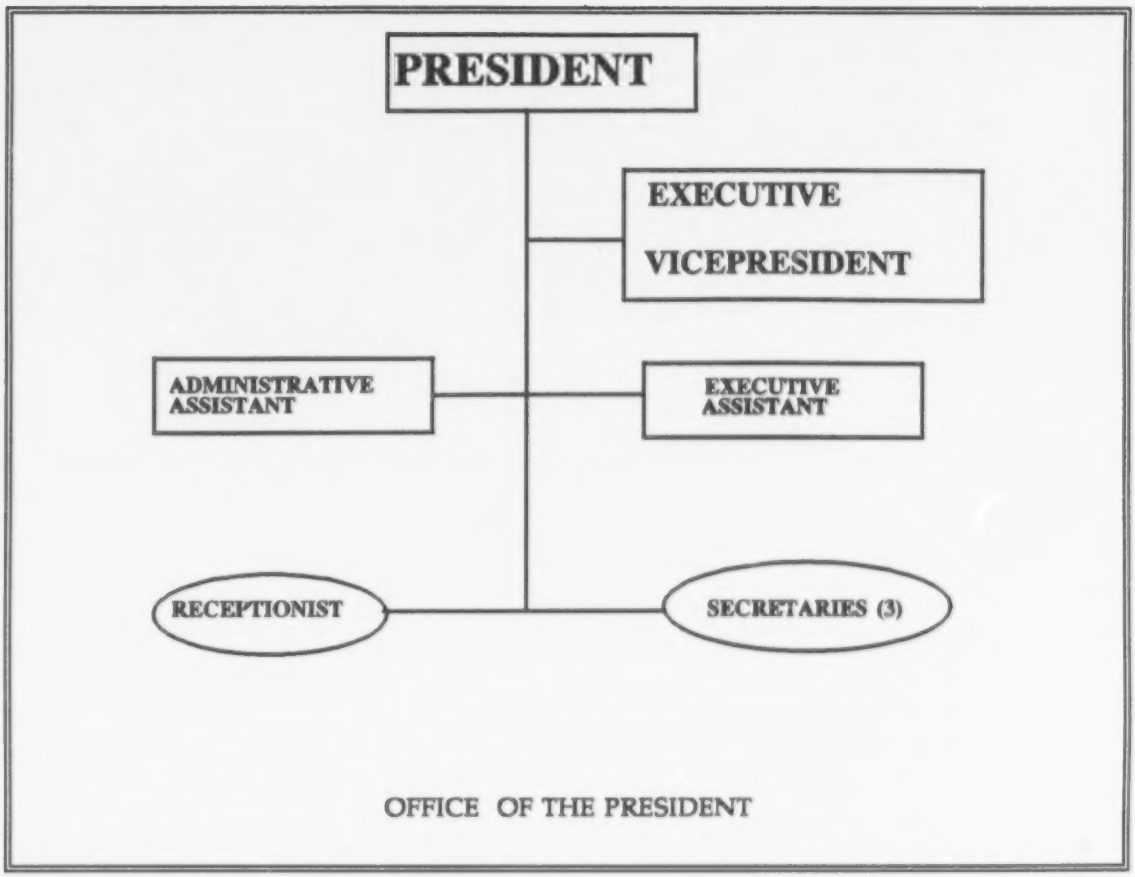
printing, mail etc..

$$3.08 * SALARYOFTHEPRESIDENT + AA + EA + RE + 3 * SE + \$50{,}000$$

BUDGET FORMULA FOR THE EXECUTIVE OFFICER

The senior administrative divisions consist of the divisions of strategic planning, finance, administration, academic affairs and student affairs. Each of these line divisions are associated with particular functions and associated staff and expenses. Details concerning each of these divisions are discussed below.

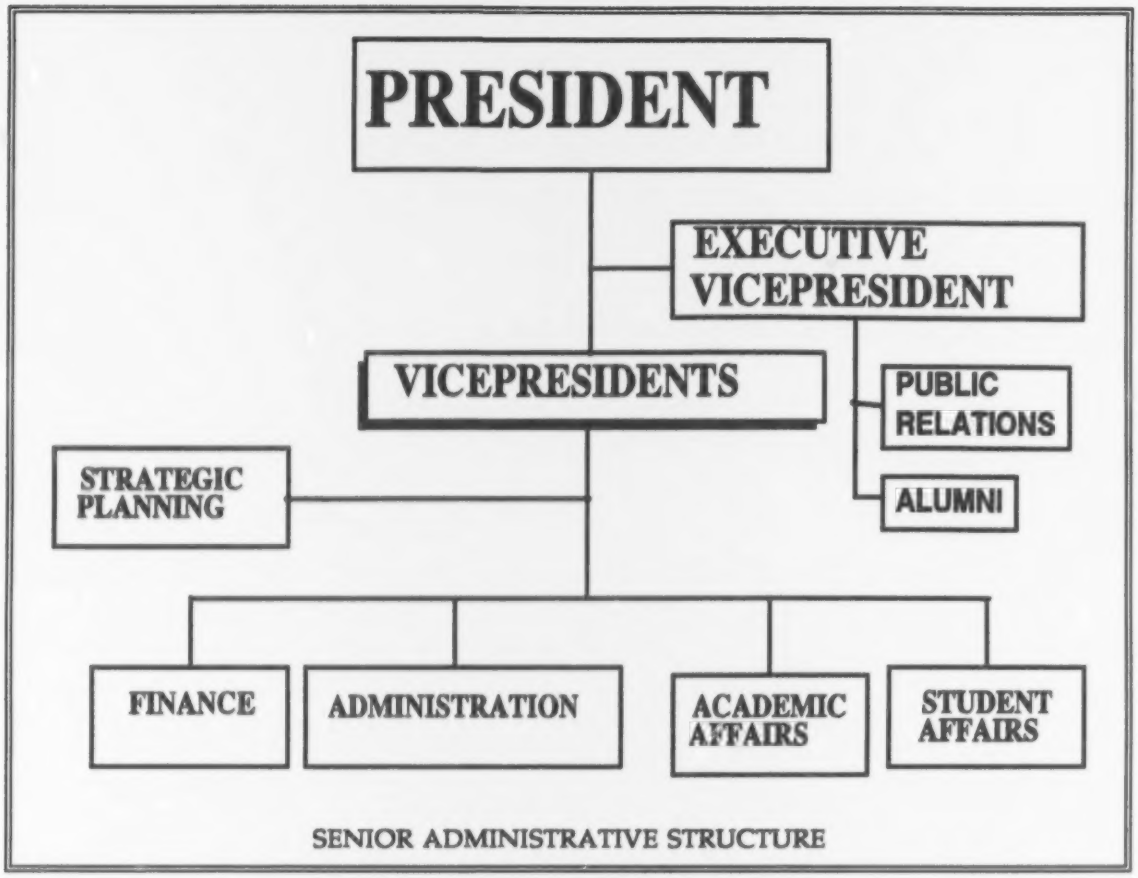
Strategic Planning: This division is led by a vicepresident assisted by an administrative assistant and a receptionist. The division is composed of four directorates: Sponsored Research, Policy Analysis, Information Systems, Curriculum & Program Development and a Development division. The function of the division of sponsored research is to coordinate faculty efforts to obtain external research funds and is staffed by a director, budget analyst and a secretary. The policy analysis directorate will function as an institutional research office projecting the impact of federal, state and local policy directions upon the institution and be staffed by a director, two statiticians and a research associate. The curriculum and program development directorate interfaces with the office of academic affairs and facilitates research based modifications of



OFFICE OF THE PRESIDENT

program and the development of new programs. The curriculum and program development directorate is staffed by a director, associate director, two staff associates and a secretary. The function of the development directorate is to conduct annual fund raising campaigns and to foster corporate giving. The development directorate is staffed by a director, administrative assistant and a secretary.

Information Systems Directorate. The information systems directorate forms the communications backbone of the institution by operating the computer and voice transmission networks and the telephone/fax systems. It is managed by a director and an assistant director aided by a secretary. The directorate is composed of six operational units: System Analysis, Telecommunication, Network Systems, User Services, Operations and Technical Services. Each



SENIOR ADMINISTRATIVE STRUCTURE

operational unit is staffed by a manager. The systems analysis unit is also staffed by two programmers. The telecommunication and network systems units are, in addition to their respective managers, each staffed by a technician and a clerk/secretary. The user services unit is staffed by three programmers. The function of the operations unit is to ensure that the computer systems are operational eighteen hours per day *including weekends* and is staffed by three operators, in addition to a manager of computer operations. The technical services unit insures that all electronic equipment on the campus are in working order and is staffed by a manager and two technicians. $150,000 is allocated to this unit to cover the costs of supplies and equipment.

The formula for calculating the cost of this unit is:

$$10.28 * SALARYOFTHEPRESIDENT + 2 * AA + RE + 6 * SE$$

BUDGET FOR THE STRATEGIC PLANNING DIRECTORATE

ORGANIZATION
OF THE
DIVISION OF STRATEGIC PLANNING

Provost & Vice President for Academic Affairs: The academic affairs division is led by the provost assisted by an associate vice president, an administrative assistant, two secretaries and a receptionist. Each college or school is led by a dean and an assistant dean supported by an administrative assistant, two secretaries and a receptionist. The academic support unit is led by

a director at the level of a college dean supported by a secretary and is responsible for the operations of the library (budget described previously) and the book store. For the purposes of this discussion it is suggested that the operations of the college bookstore be contracted to some external vendor and is coordinated by an institutionally funded director. The academic support services is directed by an administrator at the level of a dean assisted by a secretary. The academic support systems directorate is responsible for the admissions, registrat, recruiting and financial aid offices. Each of these offices are staffed by a department head, two assistants, and two clerk/secretaries.

The formula for calculating the cost of the academic affairs directorate is shown below where five percent of the total salaries is allocated for supplies, equipment and travel.

$$1.05*[(0.73*NO.OFCOLLEGES+5.90)*SALARYOFTHEPRESIDENT+AA+(NO.OFCOLLEGES+1)*RE+(13+2*NO.OFCOLLEGES)*SE]$$

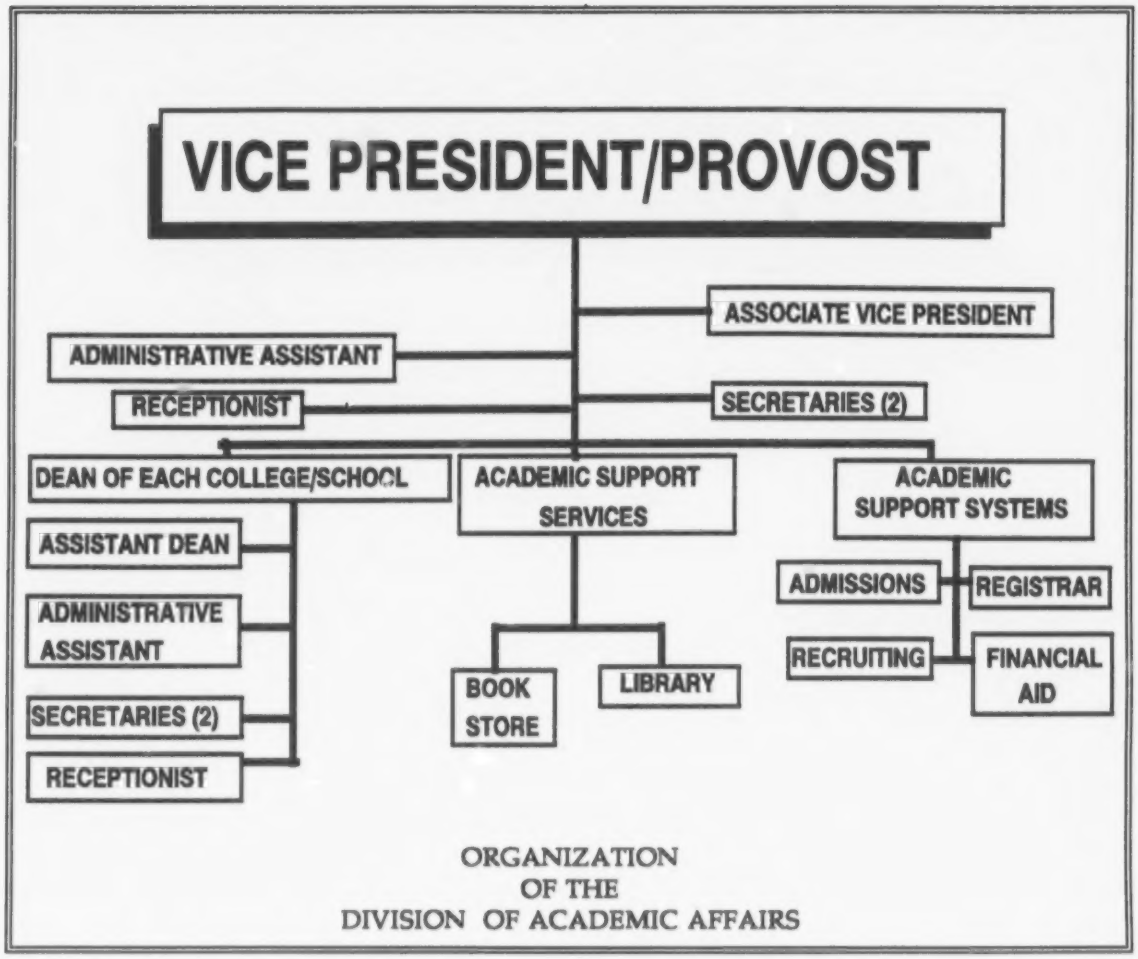
BUDGET FORMULA FOR THE ACADEMIC AFFAIRS DIRECTORATE

Administration Division: The vice president for administration is supported by a secretary and a receptionist. The division oversees three directorates: graphic arts, facilities and security. The graphic arts department is staffed with a director, secretary, receptionist and three printers. The budget formula for the *administration* of the administration division is shown below where five percent of total administrative salaries is allocated for administrative supplies and expenses.

$$1.05[3.54*SALARYOFTHEPRESIDENT+3*SE+2*RE]$$

BUDGET FROMULA FOR ONLY THE ADMINISTRATION
OF THE DIVISION OF ADMINISTRATION

Security. This directorate is administered by the administration division. It appears that the California State University plan is the most comprehensive and serves as the basis for this recommendation.



ORGANIZATION
OF THE
DIVISION OF ACADEMIC AFFAIRS

The formula for calculating the cost of the security force assuming that OFCS is the cost of the average officer is:

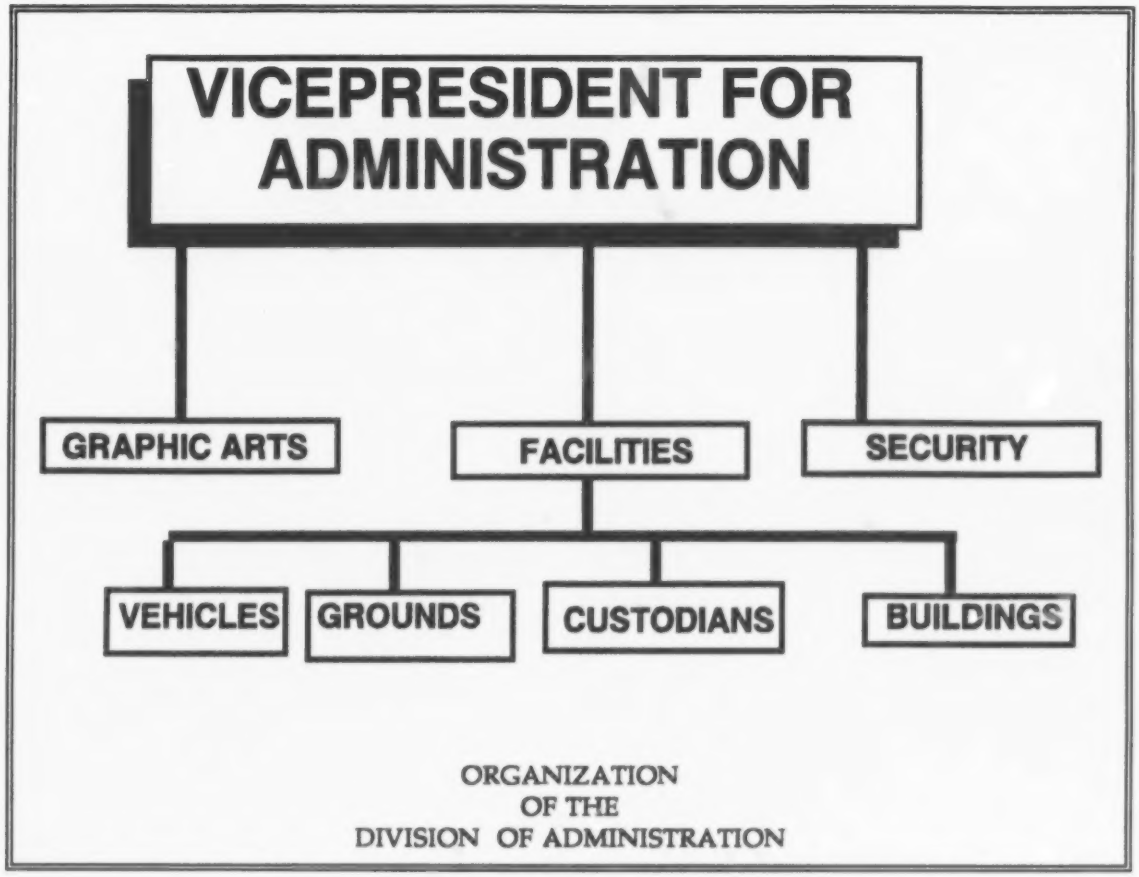
$$2*SE+1.08*OFCS*(6+\frac{1}{2}INTEGER[1+\frac{THC-10000}{|THC-10000|}]\frac{THC-10000}{3000}+\frac{1}{2}[3+\frac{ACRES-150}{|ACRES-150|}]+\frac{GSF}{700000}]$$

FORMULA FOR CALCULATING THE COST OF THE SECURITY FORCE

WHERE: ACRES=total number of acres of ground.

GSF=gross square feet of building floor space.

THC=total student headcount.



ORGANIZATION
OF THE
DIVISION OF ADMINISTRATION

OFCS=officers average salary

INTEGER=the mathematical integer function.

Facilities directorate: The facilities directorate is administered by a director and two assistant directors assisted by a secretary and receptionist. This directorate consists of four units: ground and landscaping, building maintenance, custodians and vehicle maintenance. The directorate will also be staffed by an engineer and draftsman. General administration expenses will be calculated at $0.04 per gross square foot. *Ground maintenance* staff will consist of a maintenance superintendent and 14 FTE ground keepers for up two 5,000,000 gross square feet of building space and 1 FTE ground keeper for each additional 45,000 GSF including a supplies budget of $0.035 per GSF. *Custodial services* maintain the buildings, floors, walls, boards, etc.

ELEMENTS OF A SECURITY FORCE BUDGET CALCULATION

1. The security force will not consist of less than six FTE officers regardless of the size of the campus.
2. **Up to 10,000 headcount student:** allocate 1 FTE officer for every 2,000 students.
3. **Over 10,000 headcount students:** allocate 1 FTE officer for every 3,000 students.
4. **In addition,** add 1 FTE officer for every 700,000 gross square feet of building space.
5. **In addition,** add 1 FTE officer for every 150 acres *not to exceed 2 FTE officers.*
6. **Vacation:** Allow a margin of eight percent of the total number of FTE officers for sick leave and vacation coverage.
7. **Clerical:** 2 FTE secretaries.

clean and in usable condition. Custodial services should be staffed at a rate of one FTE custodian per 15,000 GSF, one FTE window washer for every 350,000 GSF with a supplies budget equal to ten percent of the salary budget and an equipment replacement budget of $0.0092 per GSF. *Building maintenance* will insure that all buildings are maintained and perform light construction jobs. The building maintenance staff will consist of 1 FTE per 10,000 GSF and a $10,000 supply budget for every six FTE employees. In addition, 1 FTE mechanic and 1 FTE assistant would be required per 20 vehicles with an equipment cost of $1,000 per vehicle. Allow an eight percent increment in the salary budget to allow for sick leave and vacations.

$$1.08(SUPER+GRND(15+\frac{GSF-5{,}000{,}000}{|GSF-5{,}000{,}000|}\frac{GSF-5{,}000{,}000}{45{,}000})+\frac{7.56GSF}{60{,}000}+MAINT+1.18[\frac{GSF*CUST}{15{,}000}+\frac{GSF*WIND}{350{,}000}]+\frac{7.56GSF*MAINT}{60{,}000}+\frac{VECH}{20}(MECH+AMECH)+1000VECH+0.0043GSF$$

FACILITIES BUDGET FORMULA

WHERE:

SUPER:	Supervisor salary
GRND:	Ground keeper salary
CUST:	Custodian salary
WIND:	Window washer salary
VECH:	Number of vehicles

MECH: Mechanic salary

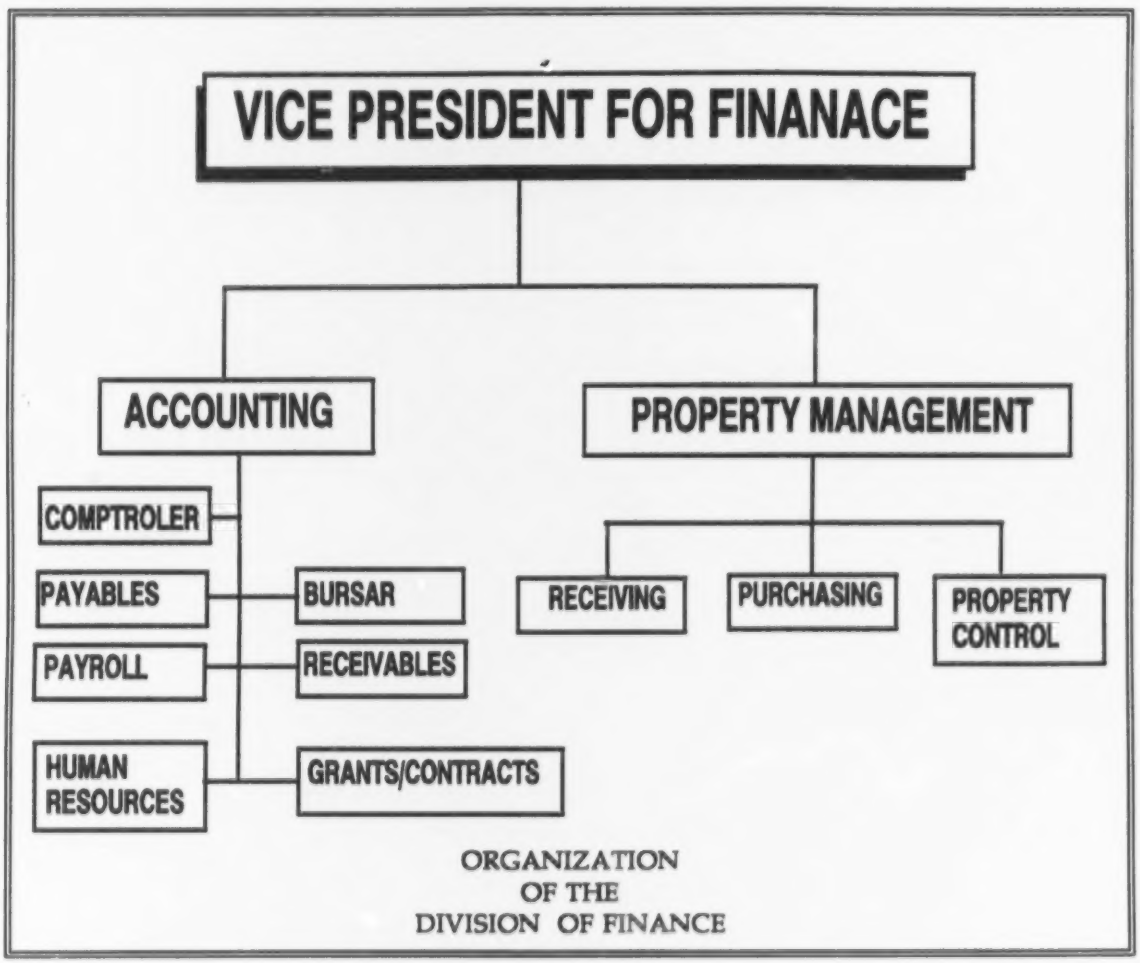
AMECH: Assistant Mechanic salary

Finance Division: The finance division monitors the fiscal affairs of an institution including fixed assetts and is administrated by a vice president assisted by a secretary. It is suggested that the division consist of two directorates:Accounting and Property Management. The accounting directorate is administered by the comptroler aided by an administrative assistant and a secretary and consists of six units: payables, payrol, human resources, bursar, receivables and grants/contracts. Each unit is administered by a unit head and a secretary. The payables and receivables departments are each staffed by five administrative assistants and a secretary. The bursar' office is staffed by two administrative assistants and five clerks for the purpose of receiving and processing cash transactions. The human resources department will consist of three administrative assistants specializing in specific areas (insurance, classified service, unclassified service, etc..) and three secretarial level positions. The grants and contracts unit will be staffed by a unit head and an administrative assistant/budget analyst funded entirely from grant overhead and not a budgeted unit. The Property Management Division consists of three units (Receiving, Purchasing and Property Control) and is administered by a director with an administrative assistant. Each property management unit is led by a unit head and an administrative assistant. The purchasing unit is also staffed by three administrative assistant level procurment specialists and two secretaries. The receiving department also operates the Mail Roon and is led by a unit head and an administrative assistant as well as five technicians/clerk/secretarial positions. The property control unit will monitor all institutional property and will be led by a unit head assisted by three clerk/secretaries.

The budget formula for the finance division is:

$$5.76 * SALARYOFTHEPRESIDENT + 28 * AA + 22 * SE$$

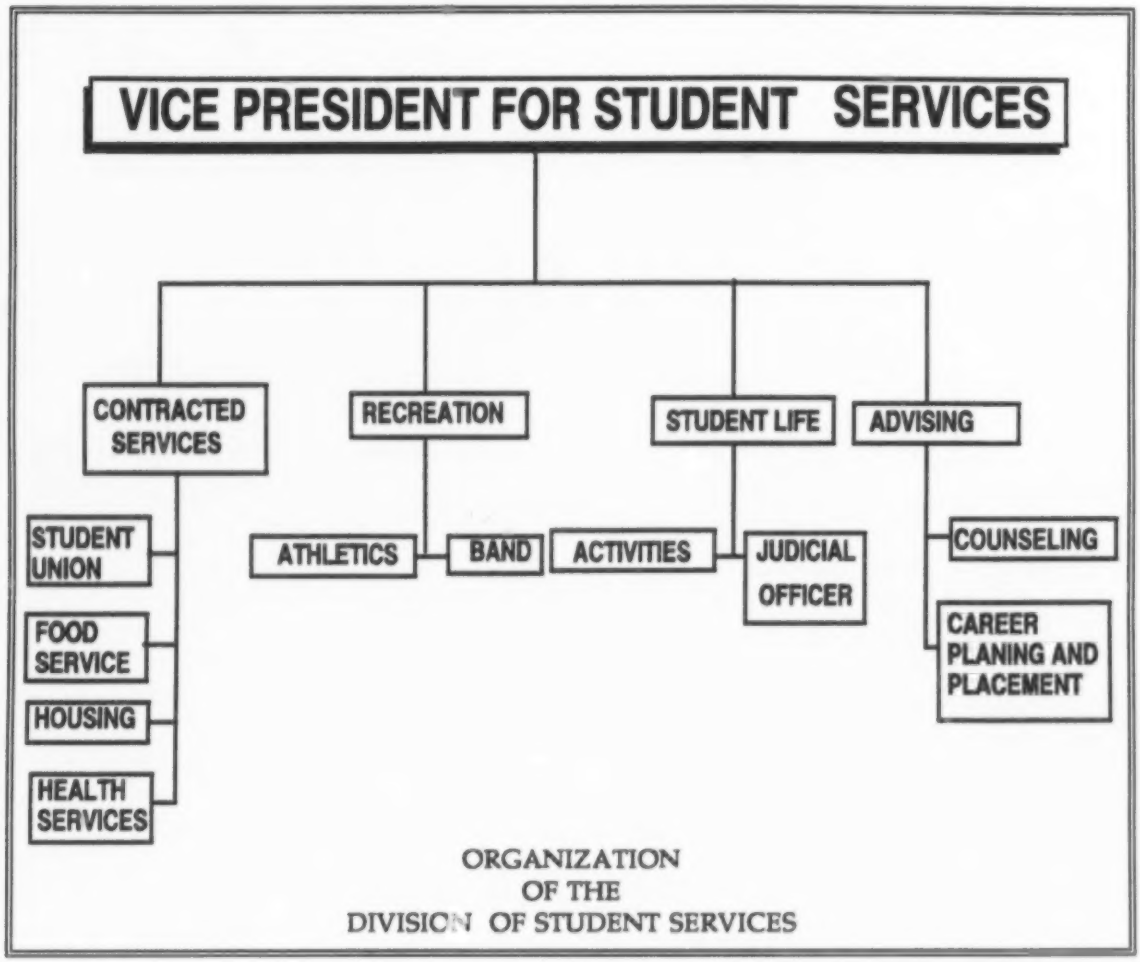
FINANCE DIVISION BUDGET FORMULA



ORGANIZATION
OF THE
DIVISION OF FINANCE

Student Services: The student services division is led by a vice president assisted by an administrative assistant, a secretary and a receptionist. The division is composed of four directorates: Contracted Services, Recreation, Student Life and Advising. Each directorate is administered by a director assisted by a secretary. The advising component is funded through

the funds previously described under curriculum. The Contracted Services division consists of the operations of the student union, food services, housing and health services. Each contracted services unit is directed by a unit head assisted by a secretary. Each contracted services unit is expected to be funded from student fees and, hence, is not staffed from an institutional budget.



ORGANIZATION
OF THE
DIVISION OF STUDENT SERVICES

The athletics and band units are led by a director and a secretary. Other costs associated with the athletics and band units have been previously described. The student life directorate consists of two units: activities and judicial officer. The activities should be paid from student fees and not be part of the institutional budget. The judicial officer unit is staffed by a unit head and a

secretary. Five percent of the personnel budget is allocated for supplies and related expenses. The funding formula for the division of student services is:

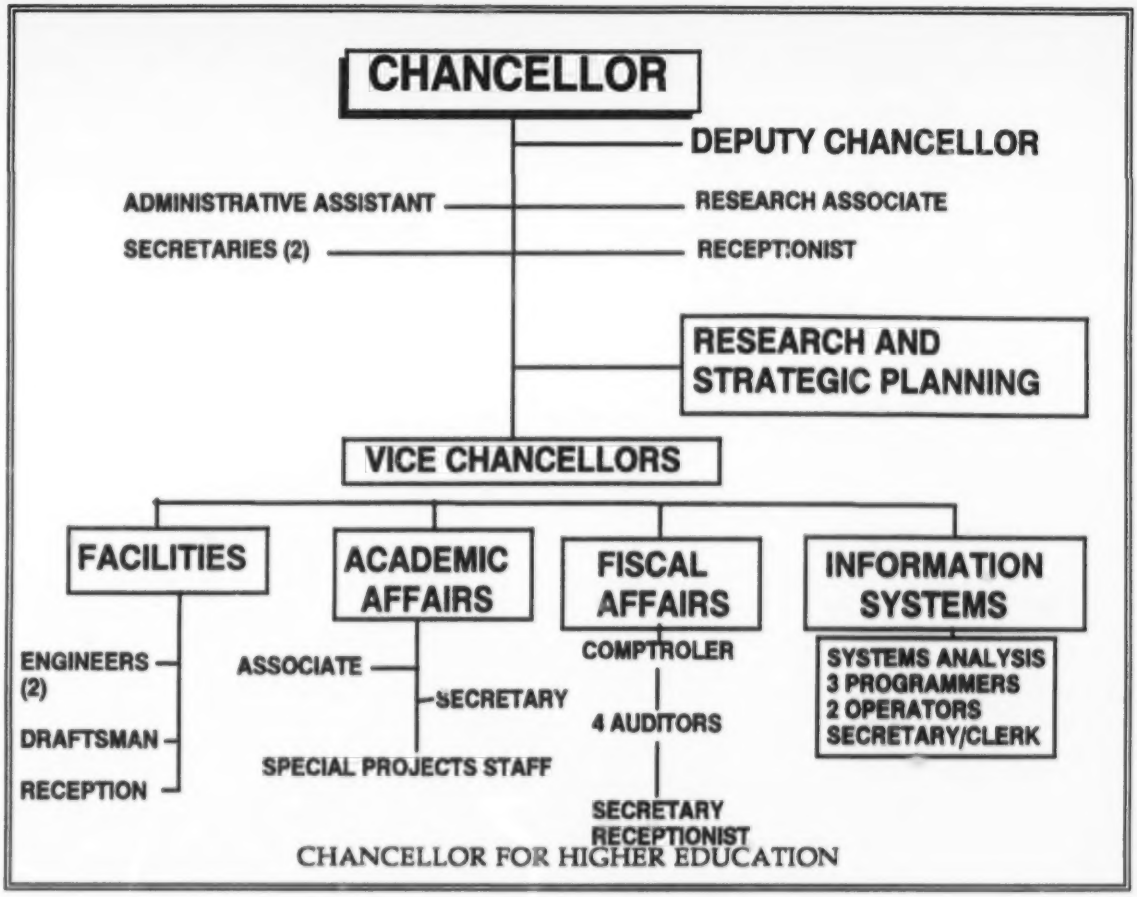
$$1.05[5.55*SALARYOFTHEPRESIDENT+AA+12*SE+RE]$$

STUDENT SERVICES DIVISION BUDGET FORMULA

Utilities and Fringe Benefits. Fifteen percent of the maintenace budget is allocated for electricity, water and heat. Approximately forty percent of the salary budget is allocated for fringe benefits.

STATE ADMINISTRATIVE OFFICES

The office of the chancellor of higher education has an important role in the evolution of higher education. The office coordinates the activities of the campuses, acilitates the definition of mission and goals, interfaces with the legislature and provides incentives for quality enhancement. The structure of that office should be kept to a minimum, making maximum use of the talent on the campuses for special projects. The basic structure should include five functional units. The executive administration includes research/strategic planning staffed by the chanellor, executive deputy chancellor and the deputy chancellor for research and strategic planning. The executive administration staff includes an administrative assistant, research assistant, two secretaries and a receptionist. The executive administration staff is suplemented by two research associates, a secretary and a receptionist assigned to the deputy chancellor for research and strategic planning. The four staff units are directed by vice chancellors. The facilities office is staffed by the vice chancellor, two engineers, one draftsman and a receptionist. The academic affairs office is staffed by a vice chancellor, an associate vice chancellor, a secretary and a special projects staff whose composition varies depending upon the nature of active projects. One percent of the institutional budgets could be allocated to central operations to fund **quality improvement** projects and an additional two percent to fund **program innitiatives**. The fiscal affairs office would consist of a



CHANCELLOR FOR HIGHER EDUCATION

vice chancellor, a comptroler, four auditors, a secretary and a receptionist. The information systems unit consists of a vice chancellor, three system analysists/programmers, two computer operators and a secretary/clerk. In addition to facility rental, $2,500 per staff member is allocated for supplies and relted expenses.

REVENUE SOURCES

Other than from state and local contributions tuition forms the basis for funding public higher education. There are two sources of tuition: students attending the university and students attending laboratory schools. Tuition at laboratory schools have been discussed previously. It is suggested that tuitions for laboratory schools be calculated at the average rates for providing

special education and special emphasis (talented, gifted and laboratory schools) in the noncollegiate sector. Since many noncollegiate special education programs include residential care where collegiate special education programs do not, it is recommended that the tuitiion for special education programs at laboratory schools be set at the level of the lowest 25-th. percentile of noncollegiate special education institutions. Those tuition rates are:

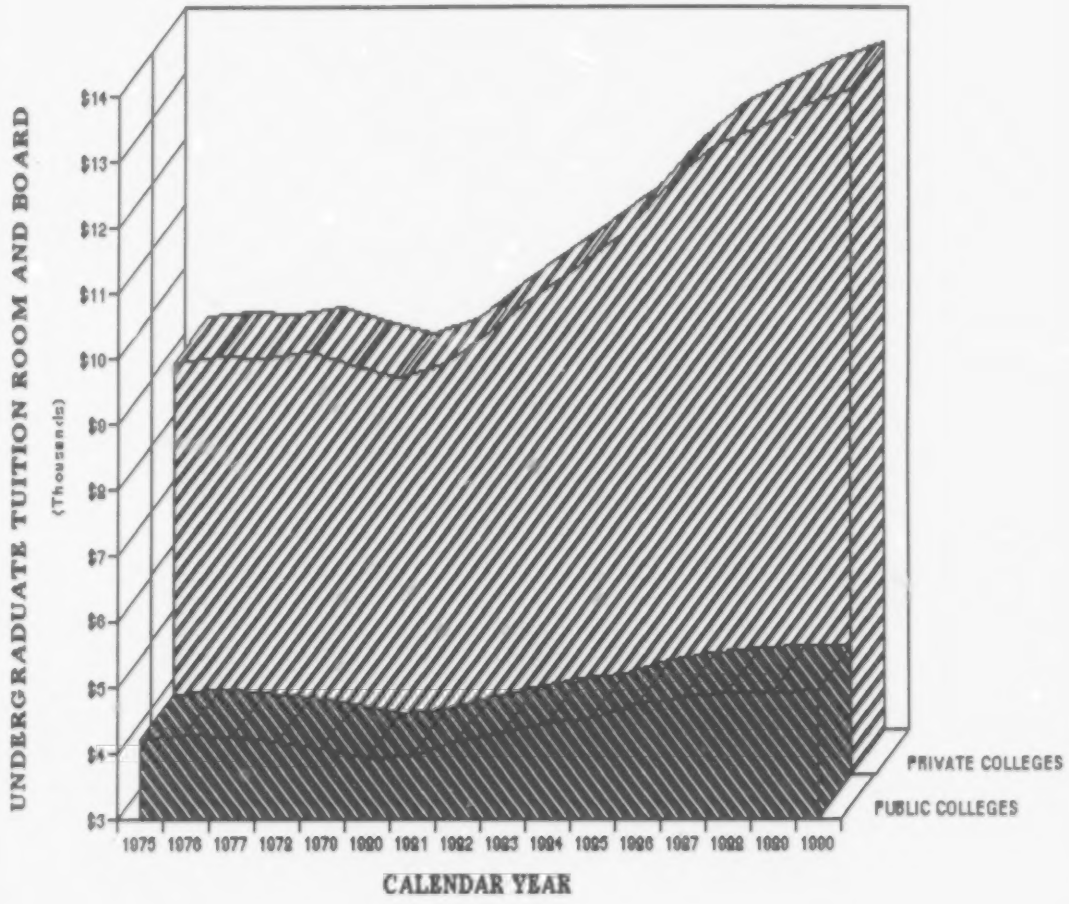
LABORATORY SCHOOL TUITION RATES

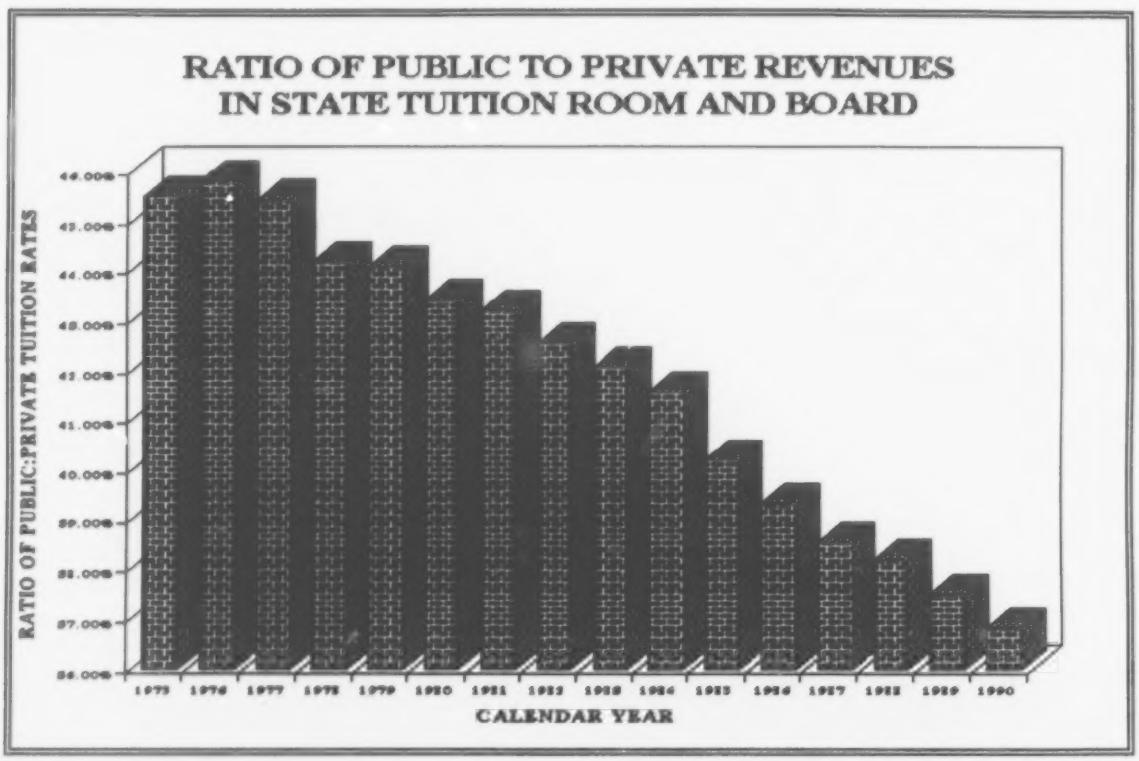
TYPE OF PROGRAM	ANNUAL TUITION RATE
HIGH SCHOOL SPECIAL EDUCATION	$7,500
ELEMENTARY SCHOOL SPECIAL EDUCATION	$6,000
OTHER HIGH SCHOOL PROGRAM	$6,500
OTHER ELEMENTARY SCHOOL PROGRAM	$2,750

The tuition rates should be adjusted for contributions made by state departments of education for the support of public schools at the colleges.

Tuition at public colleges and universities has remained relatively constant over the last twenty years while the tuition at private institutions has increased drastically over the same time period. More relevant, however, is the ratio of public to private tuition. The public to private college tuition ratio has decreased from forty six percent to approximately thirty seven (36.5) percent. In so much as the private tuition rates reflect the actual costs of providing educational services, public tuition rates have not been realistic. It is suggested that tuition, room and board rates be adjusted to reflect the previous ratio of forty six percent of private university tuition, room and board. That tuition adjustment should occur over time, however, it is a reasonable way to adjust for the changes in real costs experienced by colleges and universities. It is recommended that public college tuition, room and board charges be increased, on a national average, from $4,200 to $5,550 per year.

UNDERGRADUATE TUITION ROOM AND BOARD
(In State)




RATIO OF PUBLIC TO PRIVATE REVENUES
IN STATE TUITION ROOM AND BOARD
RATIO OF PUBLIC:PRIVATE TUITION RATES
CALENDAR YEAR

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Karen Sue Cain earned her BS degree in mathematics from Berea College and an MA degree in education with emphasis in mathematics from Eastern Kentucky University. She is currently a Senior Research Associate with the Educational Research Quarterly at Grambling State University and a student in the doctoral program in education with emphasis in developmental education at Grambling State University. Ms. Cain has been an instructor and coordinator of developmental mathematics programs at Berea College and Eastern Kentucky University since 1974. For the past six years she has conducted the Developmental Mathematics Program at Eastern Kentucky University which has enrollments of 2,000 students per semester. Ms. Cain is coauthor of the text Measurement Geometry, second edition and has written the Supplement to accompany Prealgebra by Charles P. McKeague. She has presented papers and conducted workshops at many

conferences. Current research centers on the learning disabled student in the post secondary classroom.